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A MODIFIED METHOD FOR THE DETERMINATION OF BLOOD SUGAR

LICIA G. GAMBESCIA, B.S., M.T. (ASCP), *Philadelphia, Penn.*

The Folin-Wu method of determining glucose in blood is perhaps the most widely used. However, this does not signify that it is the best method, for not only is it less specific than several methods devised subsequently but it is also not adaptable to photocolorimetry. Among several improved procedures that have been presented, depending upon the reduction of alkaline copper compounds by glucose, that of Somogyi appears to have many advantages. In applying the method to routine hospital use, several changes in technique increased its convenience. The purpose of this paper is to describe the method with these changes included. The Somogyi copper reagent was used because it has combined the advantages of four different reagents. These include (a) stability at room temperature, (b) sufficient alkalinity for use in determining slowly reacting sugars, and (c) the content of a large amount of sulphate to prevent reoxidation of cuprous oxide.[1] (d) Because of this it is not necessary to use special tubes. The Arsenomolybdate reagent of Nelson was chosen by Somogyi because it produces a color of high intensity and greater stability than the older phosphomolybdate reagents.[2]

Materials

Somogyi's Copper Reagent

Preparation—Dissolve in 700 cc. of distilled water, 28 gms. of anhydrous disodium phosphate and 40 gms. of Sodium Potassium Tartrate (Rochelle Salt). Add 100 cc. of normal sodium hydroxide and then with stirring add 80 cc. of a 10 per cent copper sulphate solution. Finally add 180 gms. anhydrous sodium sulphate and when dissolved dilute to 1 liter. Allow to stand 1 to 2 days and filter. This solution keeps indefinitely.

Arsenomolybdate Color Reagent (Nelson)

Preparation—Dissolve 25 gms. ammonium molybdate in 450 cc. of distilled water and 21 cc. concentrated sulphric acid, mix and add 3 gms. of $Na_2HASO_4 . 7H_2O$ dissolved in 25 cc. of distilled water. Mix and incubate at 37° C. for 24 to 48 hours. An alternate procedure is to heat to 55° C. for about 25 minutes. Stirring must be adequate to prevent overheating and subsequent decomposition of the chromogen. This reagent should be filtered if any precipitate is present and stored in a glass stoppered brown bottle.

Stock Glucose Standard—Weigh exactly 1.000 gms. of pure glucose. Carefully transfer to a 100 cc. volumetric flask and dilute with benzoic acid.

Standard Solution #1—Into a 100 cc. volumetric flask measure 1 cc. of stock glucose standard and dilute with benzoic acid. Then 2 cc. of this solution will equal 0.2 mgms. of glucose.

Standard Solution #2—Into a 100 cc. volumetric flask measure 2 cc. of stock glucose standard and dilute with benzoic acid. Then 2 cc. of this solution will equal 0.4 mgms. of glucose.

Benzoic Acid—Dissolve 2 gms. of benzoic acid with the aid of heat in about 800 cc. of distilled water. Cool and dilute to 1 liter.

Method

The following procedure was used in the determinations.

Into an 18 x 150 mm. test tube measure 1 cc. of a protein-free filtrate (Tungstic acid filtrates 1:10 were used in this study). Into a similar tube measure 1 cc. of distilled water. This serves as a blank. Also include 1 cc. portions of Standard #1 and #2 with each determination. Add 2 cc. of copper reagent to all tubes and cover all test tubes with glass bulbs. Place in a boiling water bath for 10 minutes. Cool for 2 minutes. Add 1 cc. or Arsenomolybdate color reagent. Replace for ½ minute in the boiling water bath. Cool for 2 minutes. Dilute to 25 cc. with distilled water. Compare photocolorimetrically.

In using the Klett-Summerson and similar Photometers, set distilled water blank at O. Then:

$$X = (U - B) \times \frac{C}{R - B} \times \frac{100}{0.1}$$

where C = concentration of Std, #1 0.1 mgs.
C = concentration of Std, #2 0.2 mgs.

For use on the visual colorimeter, set Standard at 20, then:
Using St#1

$$X = \frac{R}{20} \times 0.1 \times 1000 \text{ or } X = 5\ R$$

Using St#2

$$X = \frac{R}{10} \times 0.2 \times 1000 \text{ or } X = 20\ R$$

A series of known solutions of different concentrations extending over the ordinary range of blood sugars was analyzed. Typical results are shown on the accompanying graph. The Klett-Summerson Photometer was used for all determinations and all samples were run in duplicate.

Experimental

Unknown solutions were first determined by the Folin 1929 modification of the Folin-Wu Method, then duplicate samples were determined by the modified Somogyi method. The major variables have been tested so as to find the optimal conditions with regard to time and conditions of heating copper and arsenomolybdate reagents; time of cooling; quantities of glucose and reagents used. The results obtained in Table I show that the glass bulbs are necessary for complete oxidation.

TABLE I

Somogyi Modified Method	Folin-Wu Modification (1929)
182	189
134	79
92	82
130	96
132	104
102	82
320	248

Glass bulbs were omitted in the Somogyi Modified Method. The wide variation from the Folin method shows that they are necessary.

Only 1 ml. of copper reagent was employed on experiments in Table II; from these results we conclude that 2 cc. of copper reagent is necessary for solutions having high concentrations of glucose.

TABLE II

	Std. No. 1	Std. No. 2	Std. No. 3
Concentration of Glucose	0.1 mgms.	0.2 mgms.	0.3 mgms.
Results	84	164	190

The results in Table III show that the best results were obtained by heating the copper reagent for 10 minutes and heating the solutions containing Arsenomolybdate reagent for 30 seconds.

TABLE III

	Copper Reagent Heated for			Arsenomolydate Reagent Heated for		
	8 Mins.	9 Mins.	10 Mins.	15 Sec.	30 Sec.	45 Sec.
Standard No. 1	112	110	111	101	104	117
Standard No. 2	214	224	225	213	220	216
Standard No. 3	....	250	293	....	....	....

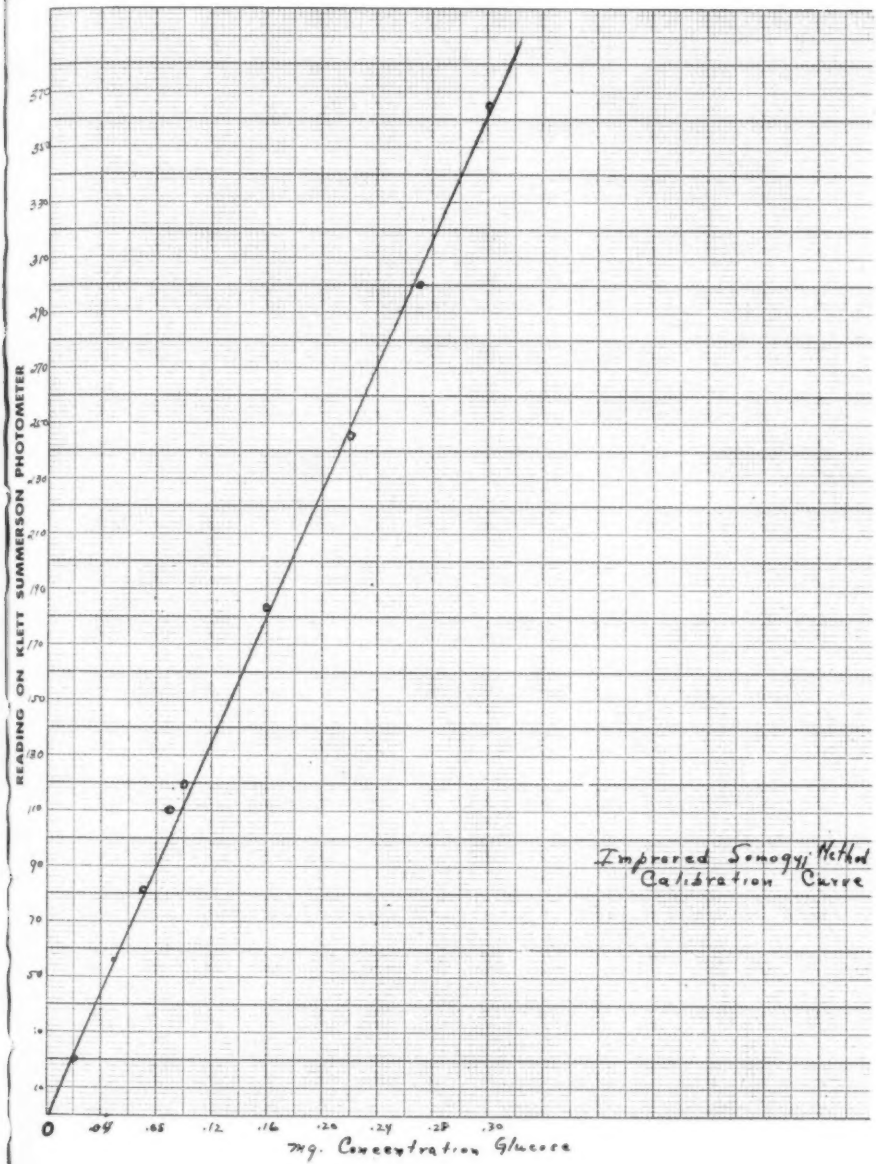
The results in Table IV show that there is no advantage in increasing the amount of color reagent.

TABLE IV

Amount Arsenomolybdate Used	Std. No. 2	Std. No. 3
0.5 cc	230	286
1.0 cc	213	278
2.0 cc	215	277

Seventy-six samples were examined by the technique previously described and the means calculated. The mean of the samples done according to the Folin (1929 Modification Method) is 87. The mean of the samples done according to the Modified Somogyi Method is 89. The precision of the two methods was the same.

As described, concentrations of glucose up to 300 mg./100cc blood can be analyzed. However, if the test solution should contain more than the equivalent of 300 mg. of glucose, the test should be repeated on one-half quantity. Should the blood glucose exceed 600 mg. further dilution is necessary.


READING ON KLETT SUMMERSON PHOTOMETER
0
.04
.08
.12
.16
.20
.24
.28
.30
mg. Concentration Glucose
Improved Sonogyi Method
Calibration Curve

Discussion

Perhaps the greatest advantage offered by this modified Somogyi Method is the increased stability of the color which may readily be measured in the photocolorimeter. Special tubes are not necessary for carrying out the determination. The stability of the final color makes it possible to run a number of determinations at one time although more than 20 simultaneous determinations should not be attempted. Another departure from the original method is the use of a tungstic acid filtrate for protein precipitation. Somogyi employs a zinc hydroxide precipitate. In our case it was more convenient to use the tungstic acid filtrate since other types of analyses, necessitating such filtrates were done on the same filtrates. An occasional low result, i.e. below 50 mgms/100 cc. bld., was obtained upon use of the above method. In this case it is suggested the blood sugar value be checked using one of the Standard methods. Furthermore, this modification requires only 1 cc of protein-free filtrate, hence only 1 cc. or less of whole blood.

Summary

Certain modifications of the Somogyi Method for determining glucose in blood are described, which in our hands have increased its convenience. The results obtained agree closely with those given by the Folin (1929) modification of the Folin-Wu method.

I am indebted to Dr. J. G. Reinhold for guidance in the study of this problem and the presentation of this paper.

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THE FLUORESCENCE METHOD OF DEMONSTRATING MYCOBACTERIUM TUBERCULOSIS IN TISSUES*

FRANK H. TANNER, M. D., Lincoln, Nebraska

The phenomenon of fluorescence has been used in scientific investigations for many years. Fluorescence is the property of certain substances to emit light of a wave length different from that to which the substance is exposed. Thus, some substances, when exposed to invisible rays of ultraviolet light, give off visible light. This principle has been used for the analysis of materials in chemistry, bacteriology and medicine.

These same principles of fluorescence may be applied to the examination of material microscopically, and fluorescence microscopy has been used since 1911. The equipment necessary for obtaining true ultraviolet light and the need for ultraviolet transmitting filters and condensers if true ultraviolet light is used had markedly limited the use of the method. More recently, simplified equipment[12] has been found suitable for certain types of investigation. Many tissues, both stained and unstained, have been examined by the fluorescence method and have been discussed by Hamperl,[6] Popper[8, 9, 10] and others.[15, 16, 17, 18]

In 1937, Hagemann[3] first proposed the staining of bacteria with fluorescent dyes and then examining them with the fluorescence microscope. He found that the analine dye auramine O would stain Mycobacterium tuberculosis and that the organism would resist decolorization in acid alcohol, whereas, other organisms readily decolorized. Thus, auramine was just as specific for acid fast organisms as was fuchsin. Hagemann stated that his method had the following advantages:[4, 5]

1. A yellow tubercle bacillus on a black background was readily visible.
2. The fluorescent organisms seemed to be "self-lighted" and therefore appeared larger than with the usual methods of examination.
3. As the result of the first two advantages, a lower power objective of the microscope could be used in place of the oil immersion.

Using the method of Hagemann, Keller[7] in 1938, confirmed the efficiency of demonstrating tubercle bacilli by fluorescence microscopy and made an additional contribution. He used the ordinary light of a concentrated filament lamp with a clever combination of filters and found that the auramine stained bacilli would fluoresce satisfactorily. Thus, by eliminating the need for true ultraviolet light, the method was greatly simplified.

In this country, Richards and Miller[12] first reported the use of a simplified fluorescence microscope with improved filters suitable for auramine stained tubercle bacilli. They reported favor-

* Read before A.S.M.T. Convention, Denver, Colo., 1947.

ably the use of the fluorescence method for smears. Thompson[22,23] using simplified equipment also reported encouraging results of a comparison of the auramine and fuchsin methods in 2,184 samples of various body fluids. Reports of the demonstration of mycobacterium tuberculosis in *tissues*, by fluorescence microcopy appeared first in European literature.[2,14] We have reported experiences with the fluorescence method for demonstrating M. tuberculosis in tissue sections in 1941 and in 1944.[19,21] The details of staining methods and apparatus used are given in these previously reported papers and there is not time to repeat them here. Our method can be obtained in reprints of those articles and in some texts of clinical laboratory procedures.

While much of the reported uses of the fluorescence method for demonstrating tubercle bacilli in tissue sections is investigative, we feel that some definite practical advantages attach to the method as compared with the usual Ziel-Nielsen procedure. The difficulties frequently encountered in searching for M. tuberculosis in tissues with the usual methods is well known to pathologists. Tissues suspected of containing the bacillus of tuberculosis may fail to reveal them, or may reveal them only after prolonged search. With the fluorescence method, the contrast of a white or yellow bacterium against a black background; the fact that the high dry and not the oil immersion lens can be used, tend to favor the finding of isolated organisms or reduce the time necessary to find organisms when plentiful. Because of this, our first report[19] of a comparison of 130 blocks of tissue from granulomatous lesions suspected of being tuberculosis gave eight more positives by the fluorescence method than by the usual carbol-fuchsin method. In addition, the fluorescence method in tissues has other advantages to the tissue pathologist. Many times in studying tissue sections with the usual hematoxylin-eosin stain, a small area of granulomatous nature is seen in the section. Sometimes this lesion is so small that additional sections of the same block of tissue may not contain the suspected lesion. In such instances, the original hematoxylin-eosin slide can be put in xylol to remove the cover slip. Then the slide is placed in acid alcohol to remove the "H and E" stain. After allowing the tissue to dry, it can be stained with the fluorescence dye auramine, exactly as if this were to be the original stain. The same granulomatous lesion seen with the "H and E" stain can thus be checked by the fluorescence microsope for the presence of acid fast organisms. If after completing this examination, the observer prefers to have the tissue restained by the hematoxylin-eosin method, this can be done.

Another observation with the fluorescence method in tissues is concerned with the comparison of the actual number of organisms stained with the fluorescence method and with the

old fuchsin method. Richards[11] found that mycolic acid, the acid fast compound isolated by Anderson from tubercle bacilli stained more easily with carbol-auramine than with carbol-fuchsin, and that the auramine resisted decolorization with acid alcohol much longer than fuchsin. The studies of Richards, Kline and Leach[13] demonstrated that the usual carbol-fuchsin stain may be applied to a smear that has been previously stained and examined by the auramine fluorescence method. The staining by auramine does not interfere with the subsequent staining by fuchsin, and thus a comparison of the actual number of organisms stained by each method, in identical fields may be made. We have made such comparisons of identical fields in tissue sections. By greatly limiting the area of tissue examined, and recording on a graph the location of each organism as seen in the slide by each method, it has been possible to compare identical fields. More organisms are visible with the auramine fluorescence method, and only occasionally does an organism appear with the Ziehl-Neelsen (carbol-fuchsin) method that has not been seen with the fluorescence microscope. Thus it would appear that, in tissue sections, more organisms are actually stained (or resist decolorization) when the auramine method is used than when the fuchsin method is used. More interesting is the fact that neither method successfully stained all the organisms given in a field, and one may assume that there are probably additional organisms which are never stained by any of our present methods. It would be interesting to know what factor determines whether the organisms of tuberculosis stain with auramine alone, fuchsin alone, both or neither.

Finally, it is suggested that the fluorescence method may be used to study the distribution of organisms in the tissues in relation to the histology of tissues. The method has already been of value in helping determine the nature of unusual granulomatous inflammations as we have previously reported.[20] By cutting serial or semiserial sections and staining two nearly identical fields, one with hematoxylin-eosin for routine histologic study and the other with auramine for detection of Mycobacterium tuberculosis, it is possible to obtain a pattern of distribution of the organisms in the tissues. Their relation to the histologic tubercle, to the arterial, venous and lymphatic systems can readily be studied.

While skill in examination by the fluorescence method is easily acquired, one must still rely on morphologic characteristics to identify the Mycobacterium tuberculosis just as with the ordinary method of staining. When better equipment becomes commercially available and a light source suitable for use with a binocular microscope can be obtained, the method will undoubtedly be used more generally.

In summary, a brief history of the development of fluorescence microscopy for demonstrating Mycobacterium tuberculosis has been given. Some observations have been presented regarding the use of this method in tissue sections, indicating that the method has certain advantages over the usual carbol-fuchsin, Ziehl-Neelsen method which enable more organisms to be found in less time, and that the method may be of value in studying the pattern of distribution of organisms in tissues infected by M. tuberculosis.

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THE USE OF CITRATE-GELATIN MIXTURES AS ROUTINE BLOOD PRESERVATIVE FOR BLOOD BANKS†

By W. O. BROWN, M. D.*

Department of Pathology, Corwin Hospital, Pueblo, Colorado.

It is advantageous to operate a plasma bank in conjunction with a whole blood bank, processing the blood into plasma when it reaches an age contradicting its use as whole blood. Of the two methods in use for the separation of the plasma and erythrocytes, i.e., centrifugation and sedimentation, the latter has two definite disadvantages:

First, the yield of plasma is appreciably lower than when the blood is centrifugalized; and

Second, while it takes only a few minutes to separate the cells by centrifugalization, several days are required with most bloods for sedimentation of the erythrocytes to approach its maximum.

The desirability of reducing these two handicaps of the sedimentation technique is obvious. The following is a report of studies on blood to which gelatin was added to the anticoagulant in an attempt to accomplish this.

It is well known that gelatin, as well as other micro-molecular substances, is capable of accelerating the sedimentation of erythrocytes.[1,2] Moreover the intravenous use of gelatin as a blood substitute is seeing considerable popularity, and it has been repeatedly observed that within wide limits it can be given with little danger of untoward reactions.[3] Properly prepared, gelatin has a low toxicity and appears stable under ordinary conditions.[4]

Because of these considerations, it was thought worthwhile to study the possibility of adding gelatin to the citrate solution into which blood is drawn in its collection for transfusions. While gelatin is used here primarily to increase the speed and completeness of the sedimentation of the erythrocytes, the other effects of the gelatin, and particularly those on the recipient of the plasma or blood were not ignored.

The contraindications to the intravenous use of gelatin solutions appear to be largely those interdicting any measure which will increase the circulating blood volume, i.e., cardiac decompensation. It has been pointed out that a 6 per cent solution of gelatin has a greater osmotic pressure than the serum proteins in their normal concentration, and that the resulting increase in blood volume is due not only to the retention within the vascular bed of the water injected as part of the infusion, but the attraction of additional water from the extracellular fluids.[1]

* The author acknowledges the cooperation of Don Baxter, Inc., Glendale, California, in supplying the material used in this study.

† Read before A.S.M.T. Convention, Denver, Colo., 1947.

This would suggest that when gelatin is given intravenously in substantial amounts in the presence of dehydration, harmful effects might result unless it is promptly supplemented with additional fluids by mouth or by vein. It is felt that these limitations would not appreciably restrict the use of whole blood or plasma containing gelatin, since in the first instance they could be applied as readily to blood or plasma lacking gelatin and in the second instance could be readily circumvented.

There remains, however, the observation by Popper, et al[5] that gelatin in very large amounts (Popper's cases received 3,000 to 6,000 cc. of 5 per cent gelatin in one to three days) is capable of producing abnormal changes in the tubular epithelium of the kidneys. It is felt that the possibility of administering enough blood or plasma to provide a comparable amount of gelatin is most improbable when used in the concentration employed here (0.3 per cent).

Methods and Materials

The blood donors of this series were outwardly normal healthy adults ranging in age from 25 to 42 years. Food had been restricted for at least the previous five hours.

The blood was collected in Baxter Transfuso-Vacs* in which the usual 4 per cent citrate solution had been replaced by a solution composed of:

Gelatin, C.P. ..... 1.5 gm.
Sodium Citrate ..... 2.0 gm.
Distilled water .....50.0 ml.

The control specimens were collected in identical bottles which contained 50 ml. of 4 per cent sodium citrate. These bottles, however, contained no initial negative pressure, and were filled with blood from the donor by attaching them to a vacuum line, using aseptic technique. A negative pressure of 10 inches of water was maintained within the bottle during the time of collection of the sample.

In addition to the blood specimen 5 ml. of blood from each donor were placed in a test tube containing 10 mgm. of Wintrobe's oxalate mixture for the determination of the hematocrit and the sedimentation rate (Wintrobe method).

An effort was made to fill each bottle to the same level with blood, so as to have equivalent heights and volumes of blood in all bottles. The discrepancies in volume and height of the column of blood that actually occurred do not affect the conclusions (vida infra).

Following collection, the control specimens of blood and those containing gelatin received identical treatment. The time of collection was noted on the label of each bottle, the bottle inverted three or four times to mix thoroughly the blood and

anti-coagulant and the bottle placed in a refrigerator maintained at 4 to 5° centigrade. The shelves previously had been found to be level. The blood specimens then were not disturbed until after sedimentation was completed. The sedimentation of the erythrocytes was determined at intervals for the next five days, when the experiment was arbitrarily terminated. The average number of determinations per bottle of blood was 13.7. The sedimentation of the erythrocytes was measured by determining in millimeters the height of the supernatant plasma layer, care being taken in the reading to avoid parallax or moving the bottle.

At the termination of the sedimentation period, the top of the cell layer and the top of the total blood column were marked on the wall of the bottle with a sharp pointed glass marking pencil. The plasma hemoglobin of each specimen was determined according to the oxy-hemaglobin technique of Sanford, Sheard & Osterberg.[6] The erythrocytes of each bottle were examined microscopically in wet mounts and each bottle then rinsed and allowed to air dry. The volumes of the erythrocyte layer, the total blood volume and by difference the plasma volume were determined by running in water from a burette to the respective marks on the bottle.

The dilution factor introduced by the anti-coagulant was corrected by subtracting fifty milliliters from the apparent plasma and the apparent total blood volumes obtained by the measurements described above. The plasma yield was then determined by the equation:

$$\text{Per Cent Plasma yield} = 100 \quad \frac{(100 \times \text{corrected plasma yield}}{\text{corrected total blood volume} \times \text{plasma volume of hematocrit})}$$

in which the plasma yield is expressed as per cent of the plasma volume as determined by the hematocrit.

From this the plasma yield (in terms of the hematocrit plasma volume) is readily determined for the various periods at which the sedimentation was measured and a graph may be constructed showing its relationship to the time factor (Fig. 1).

It will be noted that differences in volume in various bottles are in this way nullified, and at the same time all plasma values are in terms of the plasma volume obtained by centrifugalization.

The technique is admittedly crude and does not take into account such objectionable features as irregularities in the diameter of the bottle, experimental error in reading measurements, etc., but is readily capable of reflecting differences of the magnitude encountered in this study. It was also felt that these shortcomings were to a large extent compensated by adopting conditions identical with those of the routine operation of the blood bank.

Results and Discussion

In Table 1, the data collected on the blood specimens containing the gelatin-citrate mixture is summarized while in Table 2 is shown the corresponding data on the controls. It will be noted from Table 1 that the gelatin-citrate mixture resulted in an average plasma yield of 93.8 per cent of the hematocrit plasma value, while sodium citrate alone gave an average yield of only 76.2 per cent (Table 2). The gelatin-citrate mixture not only gave higher yields, but there was less individual variation between the different specimens than with the citrate controls (Fig. 1).

TABLE I—GELATIN CITRATE MIXTURE

Blood Specimen Number	I	II	III	IV	V	VI	VII	VIII	Ave.
Sex	Fe.	Fe.	Fe.	Fe.	M.	M.	Fe.	Fe.	....
Hematocrit	37	43	38	48	50	52	44	42	....
Sedimentation Rate (Wintrobe)	20	17	11	8	25	5	28	35	....
Per Cent Plasma Yield after 1 hour	48.7	45.0	40.0	52.0	77.6	61.5	62.7	70.7	....
" " " " " 2 hours	75.5	63.3	68.7	77.5	83.0	78.3	78.2	84.3	....
" " " " " 3 "	85.0	77.0	81.5	88.9	84.7	83.0	81.5	85.9	....
" " " " " 4 "	86.6	84.4	85.0	90.1	86.0	84.3	83.7	87.6	....
" " " " " 5 "	88.5	85.9	87.3	91.2	86.5	85.1	83.7	88.8	....
" " " " " 6 "	89.6	87.0	88.7	92.1	87.0	85.7	84.0	89.0	....
" " " " " 10 "	90.7	88.7	91.5	94.0	87.5	86.0	84.9	90.0	....
" " " " " 20 "	93.0	93.2	93.7	98.2	88.7	87.5	88.4	92.0	....
" " " " " 30 "	94.7	95.2	95.7	100.0	89.0	90.0	88.4	92.0	....
" " " " " 45 "	96.0	95.2	96.6	100.0	90.7	91.3	88.4	92.0	....
" " " " " 115 "	96.0	95.2	96.6	100.0	90.7	91.3	88.4	92.0	93.8
Approximate time required for Complete Sedimentation (Hours)	45	30	45	30	45	45	20	20	35
Plasma Hemoglobin, Mgs. %	130	60	60	60	118	150	90	208	110

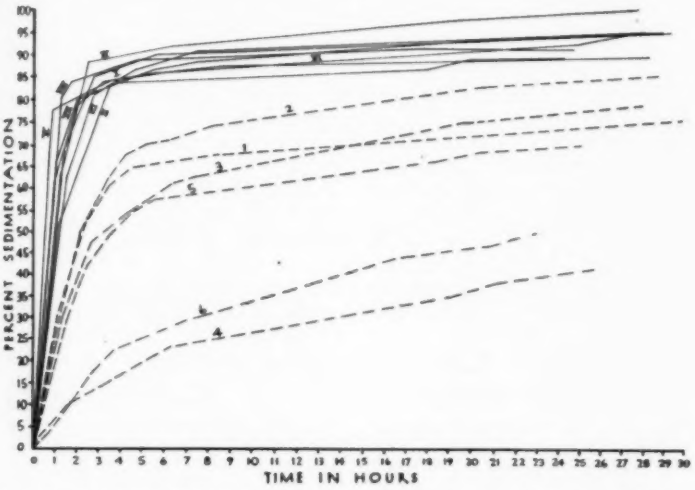
TABLE II—CITRATE CONTROLS

Blood Specimen Number	I	II	III	IV	V	VI	Ave.
Sex	Fe.	Fe.	Fe.	M.	Fe.	M.	....
Hematocrit	43	42	43	49	41	44	....
Sedimentation Rate (Wintrobe)	34	27	21	8	16	4	....
Per Cent Plasma Yield after 1 hour	26.5	24.3	21.4	6.2	19.3	6.2	....
" " " " " 2 hours	44.0	44.8	38.5	11.7	36.6	12.7	....
" " " " " 3 "	56.2	57.3	48.5	14.5	45.3	19.0	....
" " " " " 4 "	62.3	65.5	53.0	16.7	51.6	22.4	....
" " " " " 5 "	65.1	69.4	56.5	19.5	55.8	24.1	....
" " " " " 6 "	65.8	71.4	59.8	22.3	57.6	25.7	....
" " " " " 10 "	68.3	75.8	65.2	26.4	60.2	12.5	....
" " " " " 20 "	72.0	82.2	74.3	36.3	66.7	47 3	....
" " " " " 30 "	76.0	84.5	78.6	44.2	70.5	53.8	....
" " " " " 45 "	77.0	85.8	79.2	49.2	72.0	59.2	....
" " " " " 115 "	81.7	87.3	85.8	59.7	75.5	67.2	76.2
Approximate time required for Complete Sedimentation	115*	115*	115*	115*	115*	115*	115*
Plasma Hemoglobin, Mgm. %	50	30	70	84	90	64	65

* The exact end-point of sedimentation could not be determined exactly because of the great time lapse between the 45 hour and 115 hour readings.

The rate of sedimentation was considerably greater with the gelatin-citrate than the citrate alone, the difference being most striking during the first three hours of sedimentation. At 20 hours an average yield of 91.8 per cent was obtained with gelatin

as compared with 63.1 per cent with citrate. The gelatin bottles had all reached complete sedimentation by 45 hours, whereas in the control bottles sedimentation continued for a much longer time. The exact end point of sedimentation in the controls could not be determined with any degree of accuracy, since the last few measurements were spaced at considerable intervals. It took, however, at least twice as long in the control bottles as in the gelatin bottles for sedimentation to go to completion.



Constructed from Tables I and II. Solid lines represent blood specimens containing gelatin; broken lines, citrate controls.

Because of the method of calculation, no direct ratio exists between the sedimentation rate as determined by the Wintrobe method and the rate and degree of plasma yield. However, the control bloods that had the lower sedimentation rates (i.e. No. IV. & No. VI) showed lower plasma yields and sedimented more slowly than those controls having higher sedimentation rates (i.e. No. I & No. II). This correlation was absent in those bloods containing gelatin, and the plasma yield from bloods having a low sedimentation rate was as great as from those having a high rate.

The average plasma hemoglobin concentration of the blood specimens containing gelatin was 110 mg. per cent as compared to 60 mg. per cent in the control bloods, but this is felt to be due

to the lower negative pressure under which the control bloods were drawn.

At the termination of the experiment the erythrocytes of each bottle were examined microscopically in a wet mount. No difference was noted in the appearance of those from the gelatin bottles as compared to the controls. This was done on the fifth day following collection, and at this time no evidence of clumping or rouleaux formation was found.

No attempt was made to study the clinical use of plasma containing gelatin. Three units of 250 ml. each, however, were given to three recipients, and in one patient this was followed by a whole blood transfusion. No difficulty was encountered in typing or cross-matching the blood in this instance.

In view of the fact that citrate is known to retard the sedimentation of erythrocytes,[1] it is not surprising that the sedimentation technique of plasma preparation compares so poorly with the centrifugalization method. This may be largely overcome however by the addition of some innocuous macromolecular substance such as gelatin.

Summary

The plasma yield from blood bank specimens of blood containing the usual 50 milliliters of 4 per cent sodium citrate as anticoagulant is compared with the plasma yield from blood specimens collected in a similar fashion but which contained 3 per cent gelatin in the anticoagulant in addition to the sodium citrate. Whereas the sodium citrate controls showed an average plasma yield of 76.2 percent of the hematocrit plasma volume, and required about 115 hours to sediment, those bottles containing gelatin gave an average plasma yield of 93.8 per cent, and required only 35 hours for sedimentation. It is felt that the addition of gelatin in the amount used here introduces no complications in the clinical use of such blood or plasma, and offers a distinct advantage in the operation of a blood and plasma bank.

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A PLAN TO FIND THE TITER OF AN ANTICOMPLEMENTARY BLOOD SERUM OR SPINAL FLUID

By CHAS. E. OATES, M. D.

1. Reason for This Paper

Since the beginning of the intensive study and treatment of syphilis, there has been a growing demand for a titer or quantitative study of blood serum and spinal fluid. The titer of blood serum is very conveniently and accurately obtained by many of the precipitation tests, but the complement fixation test is preferred by many for the spinal fluids. Dr. Eagle[1] said he would not use a complement fixation test if it were not for testing spinal fluids for syphilis. Very frequently we have spinal fluid and blood sera which contain a substance or substances that combine with complement to make it inert. Such are known as anticomplementary substances and will be referred to in this paper hereafter as AC substances. Reagin is a substance in blood or spinal fluid produced by the presence of syphilis. Finding the titer or the quantitative measurement of reagin in the presence of AC substance in spinal fluid or sera is the problem considered here.

2. Why This Routine

It must also be borne in mind that some complement fixation routine tests thus far offered require that sera and spinal fluids containing AC substances, be processed[2] before testing for positivity making the quantitative measurement rather difficult. It would seem (though not known) that such processing would tend to destroy or to alter some of the reagin. It must also be borne in mind that a comparable titer cannot be obtained from different routine tests even in the hands of the same technician. This is due to the differences in the sensitivity level of each separate routine test or to error introduced by the technician. This is made clear by examining the results of the National Serologic Survey. Here it will be seen that one laboratory will report the Kolmer test 80% sensitive, another the Kohn test 85% sensitive. Still another laboratory will report the Kolmer 85% sensitive. Yet if the reports were in quantitative terms the difference would be greatly magnified. Hence to do quantitative studies there must be optimum conditions—same laboratory, same technician, same reagents and same routine test. As the quantitative study of spinal fluid is here confined to the complement fixation test, your attention is directed to the Kolmer test.

3. A Glance at the Complement Fixation Test—Unit of Reagin

In doing the complement fixation test it requires that a definite amount of complement be added to the serum or spinal fluid. In the presence of antigen and reagin the complement is fixed so

that it will not react with the indicator. Such indicator consists of red blood cells plus a dose of specific amboceptor or antibody. If the reagin is absent the complement is not fixed and will be free to dissolve or hemolyze the red blood cells. If there is just enough reagin and no more present to fix the complement exactly there will be no hemolysis of the blood cells. Results of this kind are read as 4+ or 40000 or one unit of reagin. But if there is not quite enough reagin to fix all the complement, some hemolysis will take place. If one-fourth of the blood cells are hemolyzed leaving three-fourths intact, then the result is read 3+ or 30000 or ¾ units. In like manner still less reagin with half the cells intact is read 2+ or 20000 or ½ unit of reagin, and if still less reagin with ¼ the cell intact is read 1+ or 10000 or ¼ unit of reagin.

4. Unit of AC

AC substance acts in the same way towards complement as does reagin except that *it does not require the presence of antigen*, however it will fix the complement in the presence of antigen. A definite amount of AC substance gives 4+ or 40000 or 1 unit of AC substance, less gives 3+ or 30000 or ¾ units of AC substance, still less gives 2+ or 20000 or ½ unit of AC substance, and still less gives 1+ or 10000 or ¼ unit of AC substance.

5. How Positivity Is Determined in Presence of AC Substance

So in testing for reagin there may be some AC substance present. With AC sera or spinal fluids it is always necessary to run the test in the presence of antigen *TEST* and also without antigen *CONTROL*. Complete hemolysis in both tubes, *TEST* and *CONTROL* means there is neither reagin nor AC substance. If complete hemolysis is seen in the control then no AC substance is present and whatever inhibition of hemolysis there is in *TEST* is due to reagin. There is given below for study a series of tests with varying amounts of *reagin* and *AC substance* as indicated. This series consists of two rows of tubes, front and back numbered from left to right a to h. In front is the test proper with *antigen*, and the back row *without antigen* the control. After the routine is carried out we have the reading as shown below:

	a	b	c	d	e	f	g	h
Test without antigen (CONTROL)	4+	3+	2+	1+	0	0	0	0
Test with antigen (TEST)	4+	4+	4+	4+	4+	3+	2+	1+

Dr. Kolmer[3] tells us to call all of these positive except a and b. In (a) there is complete fixation in test and control. Here we have one unit of reagin or AC substance shown in the test and one unit of AC substance shown in the control. Yet we are un-

able to estimate how much more of AC substance or reagin. For a margin of safety Dr. Kolmer does not call (b) positive, but for the sake of estimating the titer of the serum or spinal fluid that are known already to be positive a reading of 3+ as distinguished from 4+ is used here as in any other reading. Therefore in (b) there is at least ¼ unit more of reagin than of AC substance. Consequently there is at least ¼ unit of reagin in the test. Hence, it is positive. In like manner there is more reagin than AC substance in c, d, e, etc. By Dr. Kolmer's own routine all are positive that have more reagin than AC substance. On this fact rests the principle of determining the titer of an anticomplementary serum or spinal fluid.

6. To Titer R in the Presence of AC

In order to titer reagin in an anticomplementary spinal fluid or serum it is necessary to make a series of dilutions just as in doing the ordinary quantitative test. Instead of running the test only *with antigen* run also the test *without antigen* on similar dilutions. After this routine is completed on the dilutions, let us suppose we have the following results:

Dilutions	1	½	¼	⅛	1/16
without antigen (control)	4+	2+	0+	0+	0+
with antigen (test	4+	4+	4+	2+	0+

CONTROL represents the amount of AC substance present and is usually written 42000.

TEST represents the amount of (reagin + AC substance) and is usually written 44420.

If we could subtract AC substance represented by 42000 from (reagin + AC substance) represented by 44420 the result would be the amount of reagin and the problem would be finished. But as represented this cannot be done. To determine the difference these quantities must first be reduced to unity.

Finding the Difference of Unity

For this purpose the following table is used.

TABLE I

Tubes	1	2	3	4	5	6
Dilutions	1	½	¼	⅛	1/16	1/32 etc.
Unity	1	2	4	8	16	32 etc.
Unity difference	1	2	4	8	16	....

In explanation, this table represents a row of six tubes numbered from left to right, 1 to 6 inclusive. The dilutions are those usually represented in doing the quantitative test. In the six tubes the test is run on the dilutions. If there is complete fixa-

tion in tube one and none in tube two then from paragraph three this is written 400000 and is one unit of R in the whole serum or spinal fluid. If there is complete fixation in tubes one and two and none in three, this is written 44000. This means that tube two with ½ dilution has one unit of R and the whole has two units. Also if there is complete fixation in tubes 1, 2, 3, and none in 4 this is written 444000, then tube three with ¼ dilution has one unit of R and the whole serum has four units. Likewise if tubes 1, 2, 3, and 4, have complete fixation and none in tube 5, then tube 4 with ⅛ dilution has one unit of R and tube 1 has 8 units. In like manner if tubes 1, 2, 3, 4, and 5 have complete fixation and none in 6 then tube 5 with 1/16 dilution has one unit in it and tube one has 16 units in it. This same procedure could continue indefinitely. It will be seen from this table that the denominator of the fraction representing the highest dilution in which there is complete fixation represents the number of units in the whole serum or spinal fluid. But the UNITY DIFFERENCE represented in the Table I must be very carefully considered. This unity difference is represented by the numbers midway between the columns represented by the tubes. It is seen that these numbers show the number of units difference between the tubes where they are placed. This unity difference is very essential in the results of fixation being incomplete in the last tube, giving in that tube 3+, 2+, or 1+.

8. Conversion of Pluses Into Unity

Referring to the titration above (paragraph 6) of a serum or spinal fluid, having anticomplementary substance, with the test (with antigen) giving 44420 (R + AC) and the control (without antigen) giving 42000 AC, further consideration is made to determine the number units of reagin. From Table I and its explanation 44400 gives us 4 units. But we have 2+ in 4th tube. If this had been a 4+ in fourth tube the result would be 8 units. But it is not 4+ but is 2+. And 2+ is ½ of 4+. So the amount to be added to the 44400 (4 units) is ½ the unity difference between tubes 3 and 4 or ½ of 4 or 2 units. And 44420 = 4 units + 2 units = 6 units of R + AC. In the same way 42000 = 1½ units of AC. Let us see how this is. From Table I we see that 40000 is one unit. But we have 42000. This 2+ in the 2nd tube is vastly different to that 2+ in the 4th tube above but is estimated in the same way. Two plus in the 2nd tube is again ½ of 4+. We see that the unity difference between tube 1 and 2 is one unit. And ½ of 1 unit is ½ unit. Hence 42000 = 1½ units. Now 44420 = 6 units of R + AC and 42000 = 1½ units AC. Now we can subtract 6 units (R + AC) minus 1½ units AC = 4½ units R.

9. Conversion of Unity Back Into Pluses

For this purpose let us develop Table II.

TABLE II

A. From Paragraph 3 above we learned that:
1+ or 10000 = ¼ unit, and 2+ or 20000 = ½ unit.
3+ or 30000 = ¾ unit and 4+ or 40000 = 1 unit.

B. From Table I the unity difference between tubes 1 and 2 is 1 unit.
41000 = what?, From A above 40000 = 1 unit.
and 01000 = ¼ of 1 (U.D.)* or ¼ unit, hence 41000 = ¼ unit.

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*Unity Difference.
42000 = what ? 02000 = 2/4 of 1 (U.D.) = ½ unit, and 42000 = 1 + ½ = 1½ units.
43000 = what ? 03000 = ¾ of 1 (U.D.) = ¾ units; and 43000 =1 + ¾ = 1¾ units.
44000 = what ? 04000 = 4/4 of 1 (U.D.) = 1 unit; and 44000 =1 + 1 = 2 units.

C. From Table I the second unity difference (U.D.) is 2 is used to estimate 3d place.
44100 = what ? From B above 44000 = 2 units.
and 00100 = ¼ of 2 (U.D.) or ½ unit. Hence 44100 = 2 + ½ or 2½ units.
44200 = what ? 00200 = 2/4 of 2 (U.D.) = 1 unit; and 44200 = 2 + 1 or 3 units.
44300 = what 00300 = ¾ of 2 (U.D.) = 1½ units; and 44300 = 2 + 1½ or 3½ units.
44400 = what ? 00400 = 4/4 of 2 (U.D.) = 2 units; and 44400 = 2 + 2 or 4 units.

D. From Table I the U.D. used to estimate fourth place is 4 units.
44410 = what ? From C above 44400 = 4 units,
and 00010 = ¼ of 4 (U.D.) = 1 unit. Hence 44410 = 4 + 1 = 5 units.
44420 = what ? 00020 = 2/4 of 4 (U.D.) = 2 units; and 44420 = 4 + 2 = 6 units.
44430 = what ? 00030 = ¾ of 4 (U.D.) = 3 units; and 44430 = 4 + 3 = 7 units.
44440 = what ? 00040 = 4/4 of 4 (U.D.) = 4 units; and 44440 = 4 + 4 = 8 units.

E. From Table I the U.D. used to estimate the fifth place is 8 units.
44441 = what ? From D above 44440 = 8 units,
and 00001 = ¼ of 8 (U.D.) or 2 units. Hence 44441 = 8 + 2 = 10 units.
44442 = what ? 00002 = 2/4 of 8 (U.D.) = 4 units; and 44442 = 8 + 4 = 12 units.
44443 = what ? 00003 = ¾ of 8 (U.D.) = 6 units; and 44443 = 8 + 6 = 14 units.
44444 = what ? 00004 = 4/4 of 8 (U.D.) = 8 units; 44444 = 8 + 8 = 16 units.

From the above data we may now assemble Table II.

TABLE II

From A above	10000 = ¼ unit	From D above	44410 = 5 units
	20000 = ½ unit		44420 = 6 units
	30000 = ¾ unit		44430 = 7 units
	40000 = 1 unit		44440 = 8 units
From B above	41000 = 1¼ units	From E above	44441 = 10 units
	42000 = 1¼ units		44442 = 12 units
	43000 = 1¾ units		44443 = 14 units
	44000 = 2 units		44444 = 16 units

From C above 44100 = 2½ units
44200 = 3 units
44300 = 3½ units
44400 = 4 units

10. Use of Table II

Using this table let us again return to our results of the anticomplementary titration 44420 = (R + AC) and 42000 = AC, and find the difference is 4½ units of R as shown above. To express this 4½ units in terms of pluses refer in the table to the unity nearest to 4½. We have here 4 units = 44400 and 5 units = 44410. Halfway between 4 and 5 unit is 4½ units and half way between 44400 and 44410 is 444½0. But since less than 1+ is not expressed the reading on the anticomplementary serum or spinal fluid is 44410.

By the use of this table the reading of R + AC and the reading of AC are each converted into unity. The difference is found and this again is converted back into pluses. It will be seen that as long as AC remains low that very little difference results especially where R is high.

Another example in use of Table II. To titrate an anticomplementary spinal fluid and serum make the dilutions as in any other titration of serum or spinal fluid which is not anticomplementary, except two series are made. To one antigen is added (front row) no antigen to back row. With antigen the result is 44430 which is (R + AC) and without antigen result is 44200. Using Table II we find 44430 R + AC = 7 units. 44200 (AC) = 3 units. (R + AC) — AC is 7 — 3 = 4 units of R. And referring to Table II 4 units = 44400. In making use of this article all the technician needs is Table II and to know how to use it.

Summary

It is felt that this is a very practical method of handling anticomplementary spinal fluids and is just as correct as Kolmer's routine method of doing the quantitative test on spinal fluids that are not anticomplementary. The test has been used in Medical Center at Hot Springs, Arkansas, for about ten years. But not all that time was the routine in as complete form as is presented here. IT IS ONLY AN EXTENSION OF KOLMER ROUTINE AND THE TABLE II THAT IS FELT TO BE A NEW THOUGHT.

References

1. Dr. Harry Eagle in his lecture to Health Officers at U.S.P.H.S., Medical Center, Hot Springs, Arkansas, in 1943.
2. Kolmer and Boerner Laboratory Manual, 2nd Edition, Page 336. Modified Sach's method for determining the positivity of anticomplementary sera.
3. Kolmer and Boerner Laboratory Manual, 2nd Edition, Page 335. "Finding Positivity of Anticomplementary Sera."

TIPS ON CLEANING GLASSWARE

JAMES E. KATTNER, SR., M.T. (ASCP) *Caldwell, Texas*

The "old reliable" but much-despised method of cleaning glassware with a bichromate solution has always been reliable but highly impractical. Not only have technologists always dodged the job, but we have often wondered if there wasn't another way to accomplish the desired results.

With this in mind, try using Chlorox, Purex, chlorinated lime or hypochloride solutions. Solutions which contain at least 2.5 per cent available chlorine are recommended.

For new glassware, we are using a chlorine rinse in our routine for cleaning dilution pipettes. Using a suction pump, rinse pipettes first with the chlorine solution, then with water, alcohol and finally in acetone or ether for drying.

For old glassware and glassware which cannot be hooked up to a pump, simply immerse the items in a suitable pan or crock containing the undiluted Chlorox or other chlorine compounds. You will find that it will clean all glassware in a matter of 30 minutes, even removing those undissolved organic films left on tubes which have been placed in bichromate solutions.

Bear in mind, however, that all glassware which has been placed in chlorine solutions, especially that used for serology purposes, must be thoroughly rinsed in tap and distilled water, for chlorine does have an undesirable effect on serological reagents.

You might also try Hydrogen Peroxide 3 per cent on some of those pipettes which are badly stained by crenated blood.

Another alternative for cleaning those stubbornly stained items of glass is to place them in a 10 per cent solution of potassium permanganate for several hours and then immerse them in a 10 per cent solution of oxalic acid until they are clear of film.

Some of the smaller items may be placed in a 10 per cent solution of caustic potash or potassium hydroxide or in waste sodium hydroxide solutions; allowed to boil for a few minutes and rinsed. This will clean any metals which have become soiled by corrosive substances.

And those dirty, stained bacteriology and hematology glass slides can easily be made to look like new if placed in a pan which contains one-half pint of Cresol to a gallon of water. Simply place slides in this solution and allow to boil for 5-10 minutes, or ever better, place the container with solution and slides in a steam autoclave at 10 pounds pressure for about 20 minutes. Rinse in water and dry. Not only will you have clean glass slides, but the whole "business" is then disinfected as it should be.

If you want something to clean up the "old work bench," soiled racks, shelves and scuffed-up baseboards which can always be found in a laboratory, try using Soilax. It works wonders. Just follow directions on the box for general woodwork.

And finally, the simplest way in which to wash all laboratory glassware, generally speaking, is to place the glassware in a hot solution of tri-sodium-phosphate. This solution is prepared by placing one teacup of the phosphate in every two gallons of solution prepared. Leave glassware in solution for 20-30 minutes; rinse and place in drying oven. See how nice and shiny it comes out!

AND

DORIS BRADWAY, NORRISTOWN, PENNSYLVANIA, ADDS

In response to "Have You Tried" I would like to offer the following aids:

Johnson's Wax for table tops—especially if linoleum tops.

O'Cedar Oil for all wood encased equipment.

Zero for removing black finger marks from the doctor's white furniture.

Pynamulse cleans all porcelain equipment well.

The following is irrelevant but is a help in preparing "pusher slides" used in making differentials. Simply cut the corners off with a pair of ordinary scissors **under** water. Run a bowl full of water, hold the glass slide in one hand down under the water, clip each corner off the desired angle. The water prevents any glass from flying into your face. Many technicians are skeptical until they try this for themselves. It really works! (This is not original—Dr. Fred Boerner of the Graduate Hospital, University of Pennsylvania, demonstrated it to me.)

IN MEMORIAM

Dr. Philip Hillkowitz, of Denver, Colorado, died January 30, 1948. Dr. Hillkowitz was a pioneer in the field of clinical pathology, having specialized in this field long before there were any national organizations and but few state organizations. He was the first president of the American Society of Clinical Pathologists and served in that capacity from 1922-23.

Dr. Hillkowitz served as Professor of Pathology at the University of Colorado for several years. He served as Director of Laboratories at Beth Israel Hospital, Mercy Hospital, St. Anthony's Hospital in Denver and at St. Joseph's Hospital in Alliance, Neb. He was a founder of the Jewish Consumptives' Relief Society, and served as its president for forty-four consecutive terms.

In the death of Dr. Hillkowitz, the American Society of Medical Technologists lost a staunch friend. It was largely through the efforts of Dr. Hillkowitz that the Registry of Medical Technologists of the A.S.C.P. was established. For many years he served as Chairman of the Board of Registry, and later as a member. He likewise served as Advisory Editor of the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY since the publication of the first issue in 1935. He gave unstintingly of his time and efforts towards the promotion and elevation of Medical Technology.

ACCORDING TO SCIENCE NEWS LETTER:

Rochester, New York, is first on the national life-saving program for securing, collecting, processing and distributing blood free of charge to those who need it.

Gamma globulin, a substance from blood plasma, given to mothers who contract German measles, may protect the unborn from feeblemindedness and blindness.

Improved colored prints are obtained with chemicals called colored couplers. These couplers are included in each of the thin light-sensitive layers. Eastman Kodak revealed this information.

Protozoa researchers have founded a new scientific organization to be known as the American Society of Protozoologists.

Cold germ is isolated; it is called V 14 A; and has been successfully grown on hen's eggs for almost a year.

Two Marines acquired leprosy through being tattooed in Australia.

Gigator is new name proposed for the atom smasher.

Mysterious "Factor B," first material made by plants using sunlight, may hold the key to the artificial manufacture of food in the future.

New chemical discoveries include plastic coat for eggs, sulfa drug for animals, flame-resistant paints and, a fortified margarine with a longer-lasting vitamin A content.

Bacitracin, one of the chemicals of the penicillin class is on trial in nine different cities to determine the best way of using the remedy before it goes on sale.

Asparagus contains a substance called quercetin which stops the growth of botulinus.

Iron absorption increases with vegetable intake.

Mother whale's milk is found to be rich in vitamin C.
Epidemic nausea is now called Virus X disease.
Bacteria and fungus spores, caught in arctic air at 5000 feet in a plane grew under cultivation.
Man is more vulnerable than "bugs" to radiation.

ABSTRACTS AND BOOK REVIEWS

POLYVINYL ALCOHOL FIXATIVE METHOD FOR SHIPPING FECAL SMEARS

(Abstract of article in *Science* 106:42 July 11, 1947 by Morris Goldman, plus recent modifications in the technique)

Fecal samples are often mailed to distant laboratories for diagnosis, either preserved with formalin or phenol or in an unpreserved condition. These procedures are adequate for the subsequent identification of any protozoan cysts and helminth forms present, but protozoan trophozoites are almost always destroyed or rendered unrecognizable.

The method described here makes it possible to submit trophozoite material in fixed smears on slides to be stained and examined when received in the diagnostic laboratory. A fixative is added to water-soluble polyvinyl alcohol[1] which then serves the dual purpose of fixing the fecal smear and forming a temporary mount during shipment.

The mounting medium is prepared as follows:

Elvanol	5	grams
Glacial acetic acid	5	cc.
Glycerol	1.5	cc.
Schaudinn's fixative (2 parts of saturated aqueous mercuric chloride to one part of 95% alcohol) to	100	cc.

Preparation of Smear for Shipment

A thin fecal smear is prepared on a clean slide in the usual manner. The smear should not be permitted to dry. Cover the smear with the Elvanol solution either by dipping the slide in a jar containing the Elvanol, or by applying it with a medicine dropper. In from 2 to 4 hours the slide will be dry and may then be handled and mailed in any convenient manner.

Removal of Mounting Medium

The Elvanol is removed by immersing the slide in a 5 per cent acetic acid solution at 50° to 60° C. for about 5 minutes and then rinsing in tap water for 3 minutes. The slide may now be stained by any of the usual methods, taking care first to remove the sublimate crystals by passing through iodized alcohol for 5 minutes.

Smears covered with Elvanol and kept for as long as 5 weeks (longest period tested), before being stained have shown no deterioration in the appearance of the organisms present.

[1] The product used is specified as "Elvanol 90-25" (formerly polyvinyl alcohol, Grade RH-349-A, type B, medium viscosity), obtainable from the E. I. du Pont de Nemours and Co., Electrochemicals Department, Niagara Falls, New York.

FROM THE DESK OF THE EDITORIAL STAFF

On the whole the major publishers have been very kind and thoughtful in their cooperation with the "American Journal of Medical Technology." Nevertheless, occasionally a book is passed up which should be reviewed and when we note such volumes and have access to them, the attention of our readers will be called to these publications.

Lea and Febiger's "Applied Medical Bacteriology," by Max D. Marshall of the University of California is "tops" in its field. This book is particularly recommended to those who anticipate the California State Board Examination for the California License. The collection of specimens, the laboratory procedures, and way to make reports are given for the various pathogens, thus making this little volume a classic in its practical applications. As a text for schools of medical technology this book would meet the requirements better than the majority on the market today.

Another book of considerable interest to those who are doing hematological research is the special issue of "Blood," the Journal of Hematology, entitled, "Morphologic Hematology," published by Grune and Stratton, and edited by Dr. William Dameshek. There are eighteen articles on morphological blood studies.

The Harvard University Press publication, "A Handbook for the Diagnosis of Cancer of the Uterus by the Use of Vaginal Smears," by Gates and Warren, although written for physicians, contains an excellent chapter on the preparation of these stained smears. Due to the fact that Harvard University Press publications are available only in the larger cities, we are taking the libery to quote verbatim the technique for the staining of smears.

Technique

"Well-made vaginal smears are necessary for success in diagnosis. The technique outlined by Papanicolaou and Traut and given here is not difficult, but demands close attention to produce good results. A satisfactory smear depends on (a) an adequate sample, (b) a relatively thin film of secretion on the slide, (c) immediate fixation, and (d) proper staining.

4. Making the Smear

"The well-made smear presents cells separated one from another with clear detail, free from distortion or blurring of outlines. This can be obtained only by careful but rapid spreading of the secretion and immediate fixation while the film is wet.

"The secretion is blown out of the collecting pipette onto the glass slide by quick pressure of the bulb and then spread with the back of the pipette to form a thin uniform film. The slide is immediately placed in the fixative, which consists of equal parts

of 95 per cent alcohol and ether. Complete fixation of cells probably takes place rapidly but at least ten minutes should be allowed. Smears may be left in the fixative until it is convenient to stain them, but longer than a week is undesirable. It is equally satisfactory to dry them by gentle blotting with filter paper after fixation.

5. Staining the Smear

"The success of any method of staining requires care and intelligence. It is not enough to follow directions. Good, bad, and different results may be obtained by different persons following the same directions. The technician must learn to judge from microscopic examination of the smear the optimum time for staining and the need for fresh staining solutions, and also to recognize faults in technique which may prevent perfect results in a given instance. The staining procedure recommended is the excellent one developed by Papanicolaou (Science, 1942, 95, 438-439).

General Directions

"1. All stains should be filtered before use to avoid deposits of undissolved stains.

"2. The slides should be well drained before transfer from one solution to another.

"3. Solutions should be of sufficient volume to cover slides completely.

"4. Solutions must be renewed from time to time.

"Staining dishes. The type of staining dishes used will depend on the number of smears routinely submitted to the laboratory. For an occasional smear, coplin jars are satisfactory. If more than six smears are to be stained at a time it will probably be worth while to have a permanent setup of rectangular deep staining dishes with loose-fitting covers, which will stain 20 slides at a time. This requires 24 dishes, 2 glass slide trays and 1 wire bail.

"Stains and Solutions. We have found it convenient to prepare stock solutions of stains in 400 cc. amounts. Stains lose their effectiveness with continued use. If smears are examined with this in mind, the technician will soon learn to recognize evidence of deterioration.

"Hematoxylin. We have had our best results with aqueous alum hematoxylin:

Hematoxylin	1 gm
Ammonium Potass. Alum	20 gm
Distilled Water	400 cc
Thymol	1 gm

"Disolve hematoxylin crystals in 100 cc. of distilled water by

the aid of gentle heat and add to the alum which has been dissolved in 300 cc. of distilled water. The thymol is added to prevent growth of mold. The bottle or flask should be lightly stoppered or plugged with cotton and exposed to air and light for about two weeks to ripen. After this it should be tightly corked. New hematoxylin solution, which has been aged for about two weeks, will require the full ten minutes for staining, but as it ages, the time may soon be reduced.

Orange G

"Orange G (National Aniline & Chemical Co.) 0.5% sol. in 95% alcohol make 400 cc. and add Acid Phosphotungstic (Merck & Co.) 0.060 gm.

"This stain apparently does not lose its effectiveness. However, when the volume has become insufficient, we make it a practice to discard the stain and replace with freshly prepared stain.

EA 36

"Light Green SF Yellowish (National Aniline & Chemical) 0.5% in 95% alcohol	180	cc
Bismark Brown (National Aniline & Chemical) 0.5% in 95% alcohol	40	cc
Eosin Yellowish (National Aniline & Chemical) 0.5% in 95% alcohol	180	cc
Acid phosphotungstic (Merck)	0.800	gm
Lithium carbonate, saturated aqueous solution	4	drops

"Solution EA 36 is apt to deteriorate suddenly. In our laboratory we have found that new stain is required after staining approximately 150 slides.

"**Hydrochloric Acid 0.5% Solution.** This deteriorates rather soon, usually after staining 50 or 60 slides. A slight yellow tinge indicates that it should be discarded.

"**Alcohol.** The smear is prepared for aqueous or alcoholic solutions of stain by passing through graded percentages of alcohol. When the volume of alcohol has been reduced so that there is not enough to cover the slides the alcohol should be discarded.

"The rinsing alcohol washes off excess stain. The same alcohol must not be used after different stains, that is, after OG 6 and again after EA 36. Furthermore, rinsing alcohol should be changed for each lot of slides stained. This is done by discarding the first alcohol rinse and using fresh alcohol for the third rinse.

"**Clearing Solutions.** Absolute alcohol, absolute alcohol and xylol of equal parts, and xylol should be discarded when the volume has become insufficient to cover the slides.

"**Mounting Medium.** In our laboratory we have found xylol-balsam to be satisfactory for mounting. Some workers prefer Clarite.

Staining Procedure

"Dip 5 times (5 dips should take approximately 4 seconds altogether) in each of the following alcohol dilutions in the order given:

80%, 70%, 50%.

Dip 5 times in water.

Stain 10 minutes or less in aqueous alum hematoxylin

Dip 5 times in water

Dip 5 times in 0.5% HCl.

Place in running water for 5 minutes.

Dip 5 times in each of the following alcohol dilutions in the order given: 50%, 70%, 80%, 95%.

Stain 45 seconds in OG 6.

Dip 5 times in each of three dishes of 95% alcohol.

Stain 1½ minutes in EA 36.

Dip 5 times in each of three dishes of 95% alcohol.

Dip 5 times in absolute alcohol, absolute alcohol and xylol (equal parts).

Dip 5 times in xylol and place in another dish of xylol where they may be left until ready to mount.

Mount with balsam or Clarite. Do not wipe off excess xylol before mounting. Use just enough mounting medium to cover the smear completely without leaving an excess at the edge of the coverslip."

TEXTBOOK OF MICROBIOLOGY by Kenneth L. Burdon, Ph.D. Professor of Bacteriology and Immunology, Baylor University of Medicine, Houston, Texas; Consultant in Bacteriology, Methodist Hospital, Houston. Third edition. 728 pages. New York: The McMillan Company 1947.

The striking feature of this book is its verbosity. The rambling style and continual use of the first and second persons definitely detract from the portion of the book written in third person. On the whole the subject matter is about average, but the organization of the text does not follow the usual run of standard college texts. Two hundred pages, nearly one third of the book, is devoted to *Elements of Bacteriology*, which does not include sterilization and disinfection. In the opinion of the reviewer, disinfection and sterilization are subjects which should be taught during the first three weeks of a course in bacteriology and not toward the middle. The reviewer cannot recommend this text for use in schools of medical technology nor as a reference text for their libraries. It is difficult to conceive that the word "microbes" is used in preference to "bacteria" in a college text written in 1947.

PRIVATE ENTERPRISE OR GOVERNMENT IN MEDICINE by Louis H. Bauer, A.B., M.D., F.A.C.P. Diplomate, American Board of Internal Medicine; Member, Board of Trustees, American Medical Association; President Medical Society of the State of New York. 201 pages: Charles C. Thomas, Springfield. Price $5.00.

Government medicine or medicine as a private enterprise is discussed from all angles in this timely book. Dr. Bauer has presented the problem of group insurance to the point; deficiencies of the present system are discussed. Every intelligent man or woman professional or non-professional should read this book because the information contained in it is authoritative. The 10-point program of the American Medical Association is given. As technologists working for those physicians who make up the medical associations, it seems most timely to the reviewer, that this book should be read by them in order for them to know what is ahead. The style is straightforward and written in everyday non-technical language.

HISTOPATHOLOGIC TECHNIC by R. D. Lillie M.D., Medical Director U. S. Public Health Service; Chief, Pathology Laboratory, National Institute of Health, Bethesda, Maryland. 300 pages Philadelphia: The Blakiston Company, 1948. Price $4.75.

This book is definitely a contribution to the field of medical technology, and should find a place in every histo-pathologic laboratory. The direct approach to the subject, the clarity of the style, the up-to-dateness, and conciseness win a place for this little volume over other more lengthy treatises. As a text for histologic technique it should fill a void long felt in schools of medical technology. Newer techniques are included, evaluated, and modifications given when the author has found modifications necessary.

NEWS AND ANNOUNCEMENTS
THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS
SIXTEENTH ANNUAL CONVENTION
JUNE 7, 8, and 9, 1948
THE MINNESOTA SOCIETY OF MEDICAL TECHNOLOGY SPEAKS!

Listen! My Children, and you shall hear
What Minnesota is planning this year.
Settle yourself in a comfortable chair.
And I'll tell you, the WHAT, the WHEN,
and the WHERE.

THE WHAT? Why, the 1948 A.S.M.T. Convention, of course.
THE WHEN? June 7, 8, and 9, 1948 But.....!
Plan to arrive the SIXTH of June
The FUN will begin that afternoon.
Stay through the week, if you think you can.
(See "Haematology Symposium" Plan.)
THE WHERE? Hotel St. Paul, St. Paul, Minnesota. (And more about THAT in a minute.)
Oh, yes, and I almost forgot THE WHO?
The answer is easy, the answer is YOU.
And by that we mean all of you: Medical Technologists and guests, Honorary Members, and Medical Technology Students.

* * * * *

Now all YOU need is the time and the money (A mere trifle, you'll agree)
WE'LL see that the skies are bright and sunny. (At least, we can try.)
WE'LL see that there's plenty to do and see.
Good times for all, we'll guarantee.
We'll see that you learn something, too.
WE'RE WANTING AND WAITING TO WELCOME YOU.
Minnesota Society signing off—turning the microphone over to the convention Committee Chairmen.

FRIEDA H. CLAUSSEN,
General Chairman,
469 Laurel Ave., St. Paul, Minnesota.

THE PUBLICITY COMMITTEE SPEAKS

They've told you a LITTLE—They've
told you SOME.
We'll tell you THE WAY you'll want to come.
So keep alistening. You won't be sorry—
And I'll tell you a nice VACATION story.

THE ST. PAUL STORY

Saint Paul, the capitol city of the state of Minnesota, is situated in the famed land of 10,000 lakes, and offers a splendid variety of attractions for convention visitors. It has a rich historical background, beginning with Father Louis Hennepin's discovery of Saint Anthony Falls in 1680 and continuing through Lt. Z. M. Pike's founding of Fort Snelling on a site purchased from the Sioux Indians in 1820.

St. Paul is most attractively located. The Mississippi River, surrounding almost the entire city in a great horseshoe curve, has caused the sloping hills, high bluffs, and rolling plateaus, that give St. Paul a variety of natural parks and interesting boulevards.

On the scenic Bus Sight-seeing Tour, planned for Sunday afternoon, you will have an opportunity to see the world famous state capitol building, designed by the late Cass Gilbert; Como Park, one of St. Paul's most outstanding parks, and known as one of the most beautiful in the country; and the University of Minnesota campus and Agricultural College. The University is one of the three largest in the U. S., and boasts of its famous Medical School.

You will want to see Sister City of Minneapolis, too, across the river (a St. Paul Story shouldn't say too much about Minneapolis, because there is great rivalry between the Twins, but just between you and me and the fence post, we know you will want

to see Minneapolis, too.) SO—we will include in our tour the Minneapolis Loop: Kenwood Parkway, Lake of the Isles, Lake Calhoun, Lake Harriet, Minnehaha Parkway, and Minnehaha Park.

Then there is the famous Ford Bridge, the great Government high dam, and the huge branch of the Ford Motor Company. We'll bring you home along the Mississippi River Boulevard and Summit Avenue, St. Paul Avenue of beautiful homes, and back to headquarters Hotel St. Paul, situated in the very center of St. Paul's business district, within easy walking distance of its largest shops and theaters.

I could go on and on with interesting facts about St. Paul, such as: "Population 325,000, nine railroads, two transcontinental air-lines, and three bus lines furnishing fast service to all parts of the U. S., seven colleges and Universities, 725 manufacturing industries, 92 park areas within the city limits, 583 lakes within a fifty mile radius," etc., etc. ad infinitum.

But many of you will want to see more than just St. Paul. Many of you will want to spend your vacation in this "Nation's finest Summer Playground," to which St. Paul is the gate-way.

So let me get on with my.....

MINNESOTA STORY

National, State, and local members of Medical Technologists' Societies, combine business with pleasure, and spend this vacation in Minnesota. As part of that vacation, attend the Symposium at the U. of Minnesota.

Minnesota is the land of fulfilled expectation where vacation dreams come true. It is more than a state, it is a "way of life" built around more than 10,000 sparkling lakes. To be exact, 11,324 lakes in Minnesota provide her with one for every mood and fancy. You can have a quiet cabin on the shore of a shady lake; a rugged north woods trip complete with a pack sack and canoe; or that happy combination—the hammock near the golf course, the bridge game near the swimming beach, fishing near the tennis court—Minnesota has them all.

From the rock-ribbed lakes of the border country to the rolling plains of the western counties, Minnesota spreads an unending variety of scenery. Some of the best has been preserved for the enjoyment of the public in State Parks and both National and State Forests. Among these famous beauty spots are Lake Itasca, the source of the Mississippi, the Dalles of the St. Croix, and the Superior National Forest.

If you can forget business, forget your troubles, relax, and take it easy even for a few brief days or weeks, you will live to a ripe old age and enjoy every minute of it. So come to Minne-

apolis and renew flagging ambitions, rebuild tired bodies, refresh weary minds. You will return to carry on the daily duties of everyday life with renewed vitality, rekindled hopes, increased ambitions, and revived aspirations.

Awaiting you are modern lakeside hotels, Northwoods lodges, and thousands of modern or rustic cabins in central places or buried in the peaceful forests. If good food is your prime requisite, there is nothing finer than our metropolitan hotels of the Twin Cities, Alverdes of St. Paul, Charlie's and Harry's of Minneapolis, The Flame of Duluth, Lowell Inn of Stillwater, Colonial Inn near Lake Minnetonka, and dozens of others in every part of Minnesota.

Minnesota extends 406 miles from north to south. Its average width is 240 miles. Its 84,086 square miles form a watershed from which rivers flow south to the Gulf of Mexico, north to Hudson's Bay, and eastward through the Great Lakes to the Atlantic Ocean. With a population of 2,792,300, there is a density of only 34.9 persons per square mile. For additional information

on specific areas for your vacation, write to the Minnesota State Tourist Bureau, Dept. B, State Capitol, St. Paul, Minnesota. Make all reservations well in advance of your arrival.

In short—
it's a real vacation land
Do come—
we know you'll think it's grand.

EILEEN B. SMITH,
Publicity Chairman,
815 Kenwood Parkway
Minneapolis 5, Minn.

We KNOW that at heart, you are anxious to learn
That, for more and more knowledge, you
constantly yearn,
In science you want to know ALL that's NEW,
So listen to what we are planning for you.

Advance Flash!

THE PROGRAM COMMITTEE SPEAKS

Maybe we **haven't** our whole scientific program completed as yet. Maybe we **haven't** outlined it in its entirety. Maybe we **don't** know to date who all our speakers will be. But we can tell you NOW that it's going to be good!

We're planning two big panels, with plenty of time for discussion. One will be on Chemistry, or a "Liver Profile," and one a panel on "Training of Medical Technologists." We have papers promised on subjects including all the major fields with extras tossed in on Blood Banks, Haematology Terminology, and even on the proper washing of Laboratory Glassware.

The scientific papers will be run concurrently—two at a time—so that you will even be able to take your choice of what you wish to hear. We have to do this to crowd in all good things that are coming our way. For one whole day of the convention is to be devoted to a trip to the famous Mayo Clinic, at Rochester, Minnesota.

This trip will be a combination scientific and entertainment feature, an opportunity to hear a couple of Mayo Clinic doctors, to visit the Mayo Clinic Laboratories, and to attend a complimentary luncheon and a tea at the Country Club, at the invitation of the Mayo Clinic Board of Governors.

You won't want to miss ANY of it. Plan NOW to attend. Make your reservations early! Write it on your calendar now.

Monday,	June 7,		All day scientific session.
Tuesday,	June 8,	A.M.	House of Delegates Meeting.
		P.M.	Scientific session.

Wednesday, June 9, trip to Rochester.

And then that Haematology Symposium follows on Thursday and Friday, at the University of Minnesota Center for Continuation Study—for those fortunate enough to be able to get in—the acommodations are limited.

Sr. M. Alcuin, OSB, Chairman
Program Committee
College of St. Scholastica
Duluth 2, Minnesota
Mollie Hill, 2325 37th St., N.W.
Washington 7, D. C.
Mrs. Jean Lawrence, 1991 Manhattan Ave.,
Palo Alto, California
Esther Wilbrecht, 301 N. Jefferson,
New Ulm, Minnesota
Mrs. Martha Strolberg, Box 162,
Howard Lake, Minnesota

ALL SET FOR ST. PAUL?
THE ENTERTAINMENT COMMITTEE SPEAKS!

Come one, Come All, to fair St. Paul!
Convention Date, June Forty Eight.
Come early, Stay Long, Ye Med Tech Throng
Please, every one, come set for FUN.
We want you ALL, in fair St. Paul.

Although the official opening of the 1948 A.S.M.T. Convention is June 7, 1948, at 9:00 A.M., the Entertainment Committee just couldn't squeeze all its plans for you into three short days! So please note. The fun really starts on Sunday, June 6.

Convening from the four corners of the U. S., and perhaps some of the neighboring countries of the world, you will want a chance to SEE the Twin Cities, St. Paul and Minneapolis. On Sunday afternoon (this was the only time the energetic Program Committee could spare us) we have planned for you a sight-seeing bus tour which takes in all high points of interest. Don't miss it.

In the evening, there will be an informal "get-acquainted" reception in the headquarters hotel Exhibit rooms. There will be your chance to visit with all your old friends and to meet new ones. There will really be time to see the wonderful EXHIBITS, too, which will be ready at this time.

On Monday evening, there will be a Smorgasbord dinner at White Pine Inn, a delightfully rustic spot a short distance from the Twin Cities. There will be a speaker. Entertainment will be

provided by "those Swedes from Minnesota." Dancing is their specialty.

A luncheon will be held on Tuesday at the St. Paul at which time Dr. Montgomery will speak. There will be door prizes and a Style Show.

On Wednesday, we will be guests of the Board of Governors of the Mayo Clinic at a luncheon, and in the afternoon at a tea at the Country Club in Rochester.

The banquet, the gala event of the Convention, will take place on Wednesday evening at the St. Paul Hotel. Everyone will be there, of course. There will be a speaker and plenty of gay entertainment.

Loretta A. Laughlin, Chairman
Entertainment Committee.
Dorothy Misjuk, Co-Chairman

THE SCIENTIFIC AND COMMERCIAL EXHIBITS COMMITTEES SPEAK

Exhibits, too, there'll be galore
Each year we keep on getting more.

The Scientific Exhibits for the ASMT National Convention for 1948 should by this date be created. All signs should have sky blue lettering against a white background. Any large state signs that a state may wish to have printed can be ordered through the Chairman of the Scientific Exhibits.

If you have not already done so, please notify Grace Mary Ederer, M. T. (ASCP), Scientific Exhibits Chairman, of the following:

1. Size of Exhibit and name.
2. Wall space required.
3. Extra materials needed such as tables, lamps, etc.

Please address Scientific Exhibits in the following manner:

ASMT Scientific Exhibits
St. Paul Hotel,
St. Paul, Minnesota

ALL EXHIBITS SHOULD BE AT THE ST. PAUL HOTEL ON OR BEFORE JUNE 3, 1948.

Grace Mary Ederer, Chairman
Scientific Exhibits
Northwestern Hospital
Minneapolis, Minnesota

The following is a list of the technical exhibitors who have contracted for space at the Sixteenth Annual Convention, St. Paul:

Difco Laboratories, Inc.
A. S. Aloe & Co.
Central Scientific Company
Ames Company
Becton Dickinson & Co.
Ortho Pharmaceutical Corporation
Abbott Company
Denver Chemical Company
Sanborn Company
Kimball Glass Company
American Hospital Supply Co.
Physicians & Hospital Supply Co.

Cecilia M. Korteum, Chairman
Technical Exhibits
1164 North Dearborn St.
Chicago 10, Ill.

THE SYMPOSIUM COMMITTEE SPEAKS

Now just as though that weren't enough
We've added a cherry to your cream puff.
First come, first served, the U. of Minn.
Will take as many as they can squeeze in.

A Haematology Seminar will be held immediately following the 1948 ASMT Convention—June 10 and 11th at the University of Minnesota Continuation Center. The subjects to be discussed by outstanding haematologists are Hemorrhagic Diseases, the Erythroblastic Anemias, and many others.

The tuition is approximately seven dollars for both days. Reservations are limited in number so be sure to fill out the following coupon and mail it in immediately. The University is unable to provide housing so make your St. Paul Hotel reservations for 2 days longer. There are excellent bus accommodations available from the Hotel to the University Campus.

Please address all inquiries concerning this seminar to:

Miss Barbara Tucker, M. T. (ASCP)
Chairman of the Seminar Committee
Northwestern Hospital Laboratory
Minneapolis, Minnesota

APPLICATION FOR HOTEL RESERVATION
AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS
ANNUAL CONVENTION, JUNE 7, 8, 9, 1948
ST. PAUL, MINNESOTA

Please make hotel reservations noted below, and mail to Chairman of Local Arrangements Committee; Miss Frieda H. Claussen, 469 Laurel Ave., St. Paul 2, Minnesota.

The St. Paul Hotel is headquarters hotel. The management will make every effort to house all ASMT members, delegates and visitors at this hotel. There are always, necessarily a limited number of single rooms available in one hotel. In order to accommodate as many as possible in the headquarters hotel, we would appreciate it very much if delegates and members will arange to share rooms, or express their willingness to be assigned a roommate by our housing bureau. Will one occupant of a room please make out this form and indicate name and address of other occupant(s).

Any overflow of reservations will be accommodated at the Lowry Hotel, one and one-half blocks from headquarters, where the rates are the same.

If, after your reservation has been made, you find that you will be unable to attend the convention, please be sure to cancel your reservation directly with the hotel.

Date of Arrival_____ Time_____

Date of Departure_____ Time_____

Name _____

Address _____

_____

_____

_____

_____

Please put check opposite the accommodations desired.

Room for 1 per day	Room for 2 Double bed	Room for 2 Twin beds	Room to accommodate 3 or 4 Persons	Suite—Living Room Bedroom and Bath
$4.00	$5.50	$6.50	$3.00 per person	
4.50	6.00	7.00		for One $12.50
5.00	6.50	7.50	Room to accommodate	15.50
5.50	7.00	8.50	5 or 6 Persons	
6.00		9.00	$2.75 per person	for Two 14.00
6.50				17.50

If no room is available at the rate requested, reservation will be made at the next higher rate.

All guest rooms in the St. Paul Hotel have outside exposure, yet are free from carline and street noises. Every room is equipped with combination tub and shower.

All Sisters desiring housing accommodations, please communicate with Sister Marcella Marie, Chairman Sisters' Hospitality Committee, St. Joseph's Hospital, St. Paul 2, Minn.

ENTERTAINMENT RESERVATION

		Number of Reservations
Sightseeing Bus Tour around Twin Cities (35 miles) Sunday afternoon, June 6	$ .75	
Informal Reception St. Paul Hotel Sunday evening, June 6	No charge	
Smorgasbord Dinner, White Pine Inn	3.00	
Bus Transportation to White Pine Inn Monday evening, June 7	.65	
Luncheon, St. Paul Hotel (Style Show—Door Prizes) Tuesday Noon, June 8	2.00	
Luncheon, Rochester, Minnesota	No charge	
Bus Transportation to Rochester and Return (170 mi.) Wednesday, June 9	2.00	
Formal Banquet, St. Paul Hotel Wednesday, evening, June 9	5.00	
TOTAL	$13.40	

Guests of members are welcome at all entertainment. Rochester reservations limited to 400.

SEMINAR RESERVATION

Please make_____reservation for me for the Haematology Seminar to be held June 10 and 11, 1948 at the University of Minnesota.

Address _____

Name _____

_____

Please check and mail all reservations to Miss Frieda Claussen, 469 Laurel Ave., St. Paul 2, Minn., before May 1, 1948.

REPORT OF THE COMMITTEE ON NOMINATIONS AND ELECTIONS

The following members of the American Society of Medical Technologists will be presented for the vote of the House of Delegates at its annual session on June 8, 1948:

For President-elect (one to be elected)

MISS IDA REILLY, Roanoke, Virginia
A.S.M.T. Member since 1939
Counsellor for Southeastern States 1945-47
Recording Secretary 1947-48
Nominating Committee member 1940
Constitution & By-Laws Committee 1946-47
Membership Committee 1947-49
President Roanoke, Va. Society 1945-47
Executive Board Va. Society of M.T.s 1947-
Paper presented ASMT Convention 1939, published, AJMT, May 1940, Vol. 6, No. 3.
Member Alpha Zeta Chapter of Phi Sigma

MISS GRACE BALLARD, Milwaukee, Wisconsin
A.S.M.T. Member since 1941
Chairman Nominating Committee 1946-47
Chairman Scientific Exhibits Committee 1946 Convention.
Chairman Awards Committee 1947-48
Wisconsin Ass'n M.T. President-elect 1947-48
Chairman Convention Committee 1939
Chairman Education Committee 1939-41
Treasurer 1941-44
Chairman Membership Committee 1946-48

For Recording Secretary (one to be elected)

MISS VERNAL JOHNSON, Oklahoma City, Okla.
A.S.M.T. Member since 1945
Member Legislation Committee 1947-50
Oklahoma S.M.T. President 1946
Convention Chairman 1945, O.S.M.T.
Member Advisory Board, O.S.M.T.
Chairman of Committee in charge of raising funds for the new Oklahoma Research Foundation.

MISS PAULINE KURACHI, Pueblo, Colorado
A.S.M.T. Member since 1944
Chairman Program Committee 1946-47
Colorado State S.M.T. Corresponding Sec'y 1946-48
Pueblo S.M.T. Sec'y-Treas. 1944-45
Chairman Constitution and Organization Committee
Co-author, First Award Paper, "The Use of the Chick Embryo in a Hospital Clinical Laboratory," published in A.J.M.T., Vol. X, No. 2
"Colloidal Gold Test, Qualitative and Quantative," published A.J.M.T. Vol. XIII, No. 1
Co-author of paper, "Admission Haematology," honorable mention, published A.J.M.T., Vol. XII, No. 2
First Award Paper, also Sabin Award, "Use of the Chick Embryo in the Study of Cryptococcoid Infection," published A.J.M.T., Vol. XI, No. 1

For Treasurer (one to be elected)

MISS BETTY McGREW, Austin, Texas
A.S.M.T. Member since 1944
Delegate to A.S.M.T. Convention 1946-47
T.S.M.T. Treasurer 1946-48
Member Travis County S.M.T.
Member Publicity Committee T.S.M.T. one year.

MISS LORETTA LAUGHLIN, Benson, Minnesota
A.S.M.T. Members since 1940
Treasurer 1944-48
Chairman Program Committee 1942-44
Chairman Entertainment Committee 1948 Convention.
Chairman State Paper-writing Contest 1946-47
Member Board of Directors, Twin-City S.M.T.

For Board of Directors (two to be elected)

SR. M. ANTONIA KLAPHEKE, Washington, D. C.
A.S.M.T. Member since 1936
Board of Directors since Nov. 1947, appointed to fill unexpired term.
Central Kentucky S.M.T. President 3 terms
Chairman Program Com. 3 terms.
Paper, "A Successful Blood Bank in Non-Teaching Hospital," published A.J.M.T., Vol. VIII, No. 1
Exhibits presented before Kentucky S.M.T. and Catholic Hospital Association.

MISS MARY NIX, Portland Oregon
A.S.M.T. Member since 1944
Delegate to A.S.M.T. Meeting 1947
Active in organization of Oregon S.M.T.
Oregon S.M.T. President 1947-

MISS LOUISE VANCE, Elmhurst, Illinois
A.S.M.T. Member since 1939
Counsellor for Great Lakes Region 1945-47
Chairman Local Arrangements and Entertainment Com. 1944 Convention
Arkansas S.M.T. President 1939-40
Chicago S.M.T. Treasurer 1944-47
President-elect 1947-48

MISS JOY HOLM, New Orleans, Louisiana
A.S.M.T. Member since 1935
Delegate to A.S.M.T. Meeting 1947
Member Education Committee 1947-
Louisiana State S.M.T. Chairman Program Committee 1946-47
Executive Board 1947

Respectfully submitted,
Henrietta Lyle, Columbia, Pa., Chairman
Gladys Jacobs, Bay City Michigan
Eunice Reinhardt, Springfield, Ill.
Clara Kruse, Oakland, Iowa
Elizabeth Kauderer, Camden, New Jersey
Helen Irene Janes, Portland, Oregon

THE ANNUAL CONVENTION OF THE CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

Will be held in Hamilton, Ontario, on May 21 and 22, 1948, at McMaster University. The facilities of the University will be available for lectures and scientific sessions. Rooms may be secured in the residences and meals in the refectory. Guests will be welcome at all but the business meetings. For further information, write to Miss Helen L. Smith, Secretary, Canadian Society of Laboratory Technologists, 294 Barton St. East, Hamilton, Ontario, Canada.

PROPOSED CHANGES IN THE CONSTITUTION AND BY-LAWS OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

The following proposed changes in the Constitution were presented to the Board of Directors who voted that the same be voted upon by the House of Delegates at the annual session on June 8, 1948. The explanatory notes are included in order that there may be further discussion by local and state groups. This will give delegates additional information in regard to the views of the organizations they will represent.

All proposals for amending the Articles of Incorporation received by the Constitution and By-Laws Committee concern Article VIII, Section 1 (a).

I. The first proposed change appears on line 9, after the word "society": to change the period to a comma and insert "unless the Board of Directors rules in individual cases that unusual circumstances justify extending membership in this society to an individual without requiring that he become a member of the subordinate society of his place of residence or employment."

This amendment was proposed in various forms by several persons. Among the reasons given: Inevitable loss of membership under the present ruling due to lack of organized societies in some thirty-odd states; inconvenience to a number of near-state-line residents who may find it more desirable and practical to belong to a society in an adjoining state. (The classical example being the District of Columbia where several technologists are employed and participate in District activities but reside in surrounding states.); racial problems in certain states would lead to exclusion of some members due to hotel restrictions. In this case the stigma of undemocratic or un-American rulings could plague the ASMT. Other peculiar situations too numerous to list seem to justify consideration of the proposal.

The amendment as here worded requires attention of the Board to individual cases. It was felt that this would tend to discourage promiscuous disregard of the rules. The Board, of course, would be the judge in what constitutes an unusual circumstance.

II. The second proposal is in regard to membership requirements. On line 12, after the number "2" to insert "possess an academic degree from an accredited college at a baccalaureate level in Medical Technology or a baccalaureate degree in arts or sciences with a major in Medical Technology."

This amendment was proposed and presented to the House of Delegates last year. The House did not approve it, but its proponents feel that the recent action of the Board of Registry of the American Society of Clinical Pathologists—namely: (1) lowering Registry standards and (2) opposition to state licensure

—justifies reconsideration of this amendment. The main argument against the proposal last year seemed to be that those not willing to submit to the Registry examination, even though they held high educational qualifications, probably lacked professional knowledge. Until this knowledge was certified an applicant could not be accepted. This assured high standards; but the Registry has now lowered these standards. It is on the cry for raising standards that the advocates of this amendment wish to include those with higher educational credits as members of the society. They feel that the one with a bachelor's degree in Medical Technology—not certified by the Registry—cannot conceivably be inferior to the high school graduate with a one year apprenticeship. The mere token of Registry examination will not constitute higher qualification in this case.

III. On line 12, after the word "at" to insert the words "least at." That particular clause would then read, "possess a degree at least at a master's level."

A belief was expressed that Ph.D.'s and others with qualifications higher than the master could be excluded from membership by literal interpretation of the statement in its present restrictive form.

IV. The fourth and last proposal voted on by the committee is to strike out the words "participate in any affairs of this Society" in the last sentence of Section 1 (a), and insert the words "vote or hold office."

Since Article II, Section 4 of the By-Laws, in reference to honorary members, states, "they shall enjoy all the privileges of the Society except office-holding and voting" it is a contradiction of the former statement. Moreover, it is not believed to be the intent of the membership to exclude guests from certain activities of the Society, but merely to assure that only active members shall have a say in the government of the Society. The amendment would accomplish this.

Proposals for Amending the By-Laws:

ARTICLE I, SECTION 1, line six: to strike out all that follows the word "Laws" and insert—"and a list of all charter members and officers by name and address to the Executive Secretary. A charter shall be issued to the subordinate society after unanimous approval by the Constitution and By-Laws Committee of this Society of the Proposed Articles of Incorporation, Constitution and By-Laws, and approval of the membership list by the Executive Secretary. Any proposed Articles of Incorporation, Constitution or By-Laws not unanimously approved by the Constitution and By-Laws Committee shall be submitted to the Board of Directors; and if approved by a majority of the Directors a charter shall be issued."

ARTICLE II, SECTION 2, line four, after the word "Society": to insert—"Subordinate Societies may grant active membership only to those members who also become members of this Society."

ARTICLE IX, SECTION 2, after the word "years;" to insert —"The chairman of each committee shall be appointed by the President for a term of one year. Any chairman may be reappointed provided the total term as chairman and committeeman does not exceed three years."

ARTICLE IX; to add a SECTION 14, as follows: "Members of committees shall be permitted to attend the meeting of the House of Delegates and participate in discussions. Unless they are accredited delegates from a subordinate society they shall have no vote."

L. B. SOUCY, M.T. (ASCP)
Chairman, Constitution & By-Laws Committee
American Society of Medical Technologists

PLANS FOR INTERNATIONAL MEDICAL MEETING

The State Department, seeking to whip up advance interest in the Fourth International Congresses on Tropical Medicine and Malaria to be held in Washington, D. C., next May 10-18, issued a statement that 60 nations have been invited to send representatives to the first joint meeting of its kind held in the Western Hemisphere. Amsterdam was the scene of the last assembly of the Congresses in 1938, and, says State, "since the methods of preventing and treating tropical diseases have been improved markedly during the war years, the coming meeting will greatly facilitate and hasten the pooling of this useful knowledge." Collaborating on arrangements are national societies in dermatology, parasitology, veterinary medicine, malaria, tropical medicine and entomology, as well as the AMA, ACP, APHA, Southern Medical Association, National Research Council, Army, Navy, Veterans Administration, Agriculture Department and numerous other governmental and private organizations. Dr. Thomas Parran, Surgeon General of USPHS, is chairman of the organizing committee.

DUKE UNIVERSITY
DURHAM, NORTH CAROLINA

Announcement of a Course in Medical Mycology

A month's course in Medical Mycology, under the direction of Dr. Norman F. Conant, is to be offered at Duke University School of Medicine and Duke Hospital, Durham, North Carolina, June 28-July 30, 1948. The course will be offered every day in the week, except Sunday, and has been designed to insure a working

knowledge of the human pathogenic fungi within the time allotted.

Emphasis will be placed on the practical aspects of the laboratory as an aid in helping establish a diagnosis of fungus infection. Insofar as possible and as patients become available, methods of collecting materials in the clinic for study and culture will be stressed. Work with patients, clinical material, cultures and laboratory animals will serve as a basis for this course. Also, an opportunity to study pathologic material, gross and microscopic, will be given those whose previous training would allow them to obtain the greatest benefit from a study of such material.

The number of applicants for the course will be limited and the applications will be considered in the order in which they are received. An attempt will be made, however, to select students on the basis of their previous training and their stated need for this type of work.

A fee of $50.00 will be charged for this course, upon the completion of which a suitable certificate will be awarded. Please direct inquiries to Dr. Norman F. Conant, Duke University School of Medicine, Durham, N. C.

Norman F. Conant, Professor of Medical Mycology, Duke University School of Medicine, has been appointed as a Special Consultant to the United States Public Health Service as a member of the Bacteriology Study Section. The appointment covers the five year period from January 1, 1948, to December 31, 1952.

CONFERENCE REPORT, WOMEN'S BUREAU, U. S. DEPARTMENT OF LABOR

Washington, D. C., February 17-19, 1948

The A.S.M.T. was invited to send delegates to the conference called by the Women's Bureau, U. S. Department of Labor, in Washington, D. C., on February 17-19, 1948. The Board of Directors voted to send Mrs. Lucille Wallace, Miss Mary Eichman, and Mrs. Evelyn Jardine, as representatives.

President of the U. S., Harry E. Truman, opened the meeting. His address was followed by that of the Secretary of Labor, L. B. Schwellenbach. In reviewing the historical background of the American woman, the latter drew the picture of the change from the days when women were allowed only to teach, to be seamstresses, tailoresses, milliners, dressmakers, household servants, and factory operatives, to the present, "where one would find women in the highest skills and education in many fields." Later in his talk, he referred to our group in the statement that he wondered what would happen if all the women decided to retire—"where would our schools be, for 75 per cent of our teachers are women? Our hospitals couldn't function for women are 98 per

cent of our professional nurses, and 90 per cent of our MEDICAL LABORATORY TECHNICIANS." Our organization may feel gratified to receive this recognition of the rising importance of medical technology in the minds of our nation's leaders.

Delegates to this conference represented key women's organizations, State Departments of Labor, trade unions, vocational counsellors, management representatives, and educators whose activities relate to women and their economic interests. A breakdown of the above groups makes them fall into the following categories: 87 national and international organizations, 43 labor unions, 11 radio and press, and 30 other individuals whose activities center in the women's fields. The Conference was directed by Miss Frieda S. Miller, Director, Women's Bureau, Department of labor. The key speakers were Dr. C. Mildred Thompson, Dean, Vassar College; Miss Gladys Dickason, Vice President, Amalgamated, Clothing Workers of America; Dr. Ordway Tead, Board of Higher Education, New York; Dr. Hazel Kyrk, Professor of Economics, University of Chicago, and Harrison Smith, Associated Editor, Saturday Review of Literature.

Personal contacts were made and fostered by your delegates with representatives from Vocational Guidance Groups, the office of Legislation and Publicity Division of the Department of Labor, as well as the General Federation of Women's Clubs, National Federation of Business and Professional Women's Clubs, and League of Women Voters. We believe that such contacts will result in effective future assistance to our profession.

Summing up women's gains during the past century, Miss Miller stated that they had gained the full legal right to enter professions, and practically all occupations and trades; to exercise the franchise and help make laws on local, state, and national levels; to serve on juries in all but 13 states; to enjoy full rights of property and earnings in most states; to have the same rights of guardianship as men, in most cases; to keep their personal identity in most respects; and to receive the same treatment as men under the tax laws. Objectives still to be attained by women workers, Miss Miller said, include a wider application of the principles of equal pay, better working conditions and rates of pay in the large women-employing industries, on-the-job training in industry, community services to help lighten the burden of the woman who is both worker and homemaker; and a fuller recognition on the part of industry, business, and the professions that women aspire to serve in policy-making positions when their qualifications fit them for such responsibilities.

"Women also have still to realize," Miss Miller said, "their full potentialities as members of community planning boards, national and international agencies."

The most basic single fact emphasized in the three day conference was that there are 17 million women workers today who, in exact figures, make up 28 per cent of all workers and more than 30 per cent of all women, 14 years and over in the Nation's population.

TO THE MEDICAL TECHNOLOGIST WHO IS ALSO AN AUTHOR

Deadlines for State Paper-Writing Contest Chairmen to present "Award" and "Honorable Mention" papers to the Program Committee Chairmen have passed. Any further manuscripts may be submitted directly to the editor of the American Journal of Medical Technology, 2119 Arbor Ave., Houston 4, Texas, for possible publication. Many papers unsuited for reading on a program may be publication material. Any papers read before local or state meetings may also be sent to the journal. The authors of articles printed by state journals are requested to give permission for reprinting in the national journal. In this way, your work may benefit medical technologists throughout the nation. Please submit according to directions on second page of The Journal.

CHANGES OF ADDRESS

Should be mailed PROMPTLY to Miss Hermine Tate, Business Manager of A.J.M.T., Medical Center Bldg., Lafayette, Louisiana.

INFORMATION PAMPHLETS AVAILABLE

The revised edition of the A.S.M.T. INFORMATION PAMPHLET, together with application blanks for state and national membership, are available from the Executive Office, Medical Center Bldg., Lafayette, Louisiana. A.S.M.T. members who have not already applied for membership in their state societies must do so before June 30, 1948, in order to retain membership in their national organization (except possibly in exceptional cases as proposed in the Amendment of Article VIII, Section 1). If there is not already a state society to which you may belong, write the Membership Committee counsellor for your area and signify your desire to assist in such organization. She will assist you in contacting others in your state who are so interested, and will give you further information in this regard. See elsewhere in this issue the names of membership chairmen in the various states.

LOCAL AND STATE SOCIETIES

ARKANSAS

Membership Chairman: Lila L. Church, 2116 Orange St., North Little Rock.

CONNECTICUT

Florence A. Pease, Box W, Newtown, Connecticut, has been appointed Membership Chairman for the newly organizing society of medical technologists in that state. The meeting for organization was held on Saturday, February 7, at the Meriden Hospital, Meriden. Eleanor M. Hapgood, Stamford Hospital, Stamford, and Lydia Brownhill, Meriden Hospital, Meriden, are assisting the chairman.

DELAWARE

Ruth M. Church, Wilmington General Hospital, Wilmington, Delaware, Chairman of the Membership Committee for the state, was elected president of the Delaware Society of Medical Technologists, at the organizational meeting on Friday evening, January 30, 1948. Other officers elected were:

Vice-president: Martha Withers, Delaware Hospital, Wilmington
Secretary-Treasurer: Sara Bruce, Memorial Hospital, Wilmington
Directors: Elvyn Scott, Delaware Hospital
Mrs. Marie Schreyer, Delaware Hospital

ILLINOIS

The Illinois Chicago District Medical Technologists Society was accepted as the first district formed in Illinois, November, 1947. The following officers are active until June 30, 1947:

President: Ruth Feucht, 440 Groveland Place, Chicago
President-Elect: Louise Vance, 105 S. York St., Elmhurst
Secretary: Mary Turner, 727 North Lombard St., Oak Park
Treasurer: Doris Whitney, 65 Chicago St., Roselle

KANSAS

The Kansas Society of Medical Technologists met for the second time on Jan. 18, 1948, at which time the constitution was read and adopted. They are making plans for a state convention to be held in Wichita on April 23, 1948. Sr. M. Florina Johnston, Wichita Hospital, Wichita, is Membership Chairman.

MINNESOTA

Miss Frieda Claussen, 469 Laurel Ave., St. Paul, Minnesota, is Membership Chairman for the Minnesota Society of Medical Technologists.

MISSISSIPPI

The Mississippi Society of Medical Technologists has been issued Charter No. 25, of affiliation with the A.S.M.T.

NEW MEXICO

The organization meeting of the New Mexico Society of Medical Technologists will be held at Albuquerque on April 18, 1948, with Miss Elizabeth O'Toole, of Denver, Colo., as the principal speaker. Sister Charles Miriam Strassell, St. Joseph's Hospital, Albuquerque, is Membership Chairman for the state.

NORTH CAROLINA

Ann Shand Adams, Box 3539, Duke Hospital, Durham, is Membership Chairman for the state of North Carolina.

NORTH DAKOTA

The organization meeting of the North Dakota Society of Medical Technologists will be held in Bismarck on April 11, 1948. Sister M. Eleanor Mischel, St. Alexius Hospital, Bismarck, is Membership Chairman. Mrs. Lucille Wallace, President of A. S.M.T. will speak at this meeting.

OKLAHOMA

Membership Chairman: Anne Adwan, 1115 Medical Arts Bldg., Oklahoma City 2.

RHODE ISLAND

Membership Chairman: Ruth F. Thomson, The Memorial Hospital, Pawtucket.

SOUTH DAKOTA

Mrs. Lucille Wallace will speak at the organization meeting of the South Dakota Society of Medical Technologists, to be held in Mitchell, on April 8, 1948. Mr. Harry Falconer, 1311 So. Main, Sioux Falls, is Membership Chairman, Sister M. Veronica Ogden, 305 S. State St., Aberdeen, is also assisting with the organization efforts.

TENNESSEE

The Tennessee Association of Medical Technologists held its annual banquet on January 23, 1948.

TEXAS

The Texas Society of Medical Technologists will meet in annual convention at the Baker Hotel, Dallas, on April 23 and 24, 1948. The School of Medical Technology of the Harris Memorial Methodist Hospital, Ft. Worth, held a Seminar on Cardiolipin Antigen and Rh-Hr Factors, on February 29. Miss Estelle Boyd, 406 Lott St., Yoakum, is Membership Chairman.

UTAH

The Utah Society of Medical Technologists has been issued Charter No. 24, of affiliation with the A.S.M.T.

WEST VIRGINIA

Membership Chairman: Dorothy P. Crawford, American Viscose Corporation, Nitro.

WYOMING

The Wyoming Society of Medical Technologists has elected officers and will meet to pass on their Constitution and By-Laws in late March, 1948. Miss Elizabeth O'Toole of Denver, Colorado, will meet with them. Georgia Schmidt, 708 East 21st, Cheyenne, is Membership Chairman.

In other states, for membership and state organizations, contact counsellors or state secretaries as follows:

A.S.M.T. members who have not already affiliated with their state societies, and whose states do not have Membership Chairmen listed above, may contact the following:

ALABAMA: Miss Lucille Godelfer, 2928 Bell St., New Orleans, La.

ARIZONA: Miss Mary Wood, Yakima Medical & Surgical Clinic, Yakima, Washington

CALIFORNIA: Miss Jeanne Jorgenson, 900 Modoc St., Berkeley 7, Cal., or Miss Genevieve Walters, 1204 Ozone St., Santa Monica, Sec'y., C.S.M.T. Convention on May 7, 8 at Huntington Mem. Hosp., Pasadena.

COLORADO: Miss Pauline Kurachi, Colorado State Hospital, Pueblo, Sec'y., Colorado S.M.T.

DISTRICT OF COLUMBIA: Mrs. Mary Agnes Comly, 109 Park St., Rockville, M. D., Sec'y., or Miss Ida Reilly, Roanoke Hospital Association, Roanoke, Va.

FLORIDA: Miss Lucille Godelfer, 2928 Bell St., New Orleans, La.

GEORGIA: Miss Lucille Godelfer (see above), or Miss Elizabeth E. Paulson, Sec'y., Savannah S.M.T., 515 East 41st St., Savannah.

IDAHO: Miss Mary Wood, Yakima Medical & Surgical Clinic, Yakima, Washington.

ILLINOIS: Miss Helen Gurley, Mt. Sinai Hospital, Chicago, Sec'y., Illinois M.T.s Association, or Miss Edna Luneke, 428 North College, Grand Rapids, Michigan

INDIANA: Miss Edna Luneke (see above)

IOWA: Miss Eda Luneke (see above)

KENTUCKY: Miss Dorothea Sheperd, c/o Dr. E. C. McGhee, Ashland, Sec'y., K.S.M.T., or Miss Ida Reilly, Roanoke Hospital Association, Roanoke, Va.

LOUISIANA: Miss Lucille Godelfer (see above)

MAINE: Miss Elizabeth Frey, 678 William St., Buffalo, N. Y.

MARYLAND: Mrs. Norma F. McElvain, Sec'y., Md. S.M.T., 3608 Tenth St., Baltimore; Miss Ida Reilly (see above)

MASSACHUSETTS: Miss Elfreda Klauke, 27 Forbes St., Worcester, Vice-Pres., Mass. S.M.T.; Miss Elizabeth Frey (see above)

MICHIGAN: Miss Edna Luneke (see above)

MISSISSIPPI: Miss Lucille Godelfer (see above)

MISSOURI: Miss Edna Luneke (see above)

MONTANA: Miss Mary Wood (see above)

NEBRASKA: Miss Selma Anderson, University of Nebraska, College of Dentistry, Lincoln 8, Sec'y., Nebraska S.M.T. or Miss Edna Luneke (see above)

NEVADA: Miss Mary Wood (see above)

NEW HAMPSHIRE: Miss Annie Clark, Higgins Hospital, Wolfesboro, Sec'y., N.H.S.M.T., or Miss Elizabeth Frey (see above)

NEW JERSEY: Miss Ida Reilly (see above)

NEW YORK: Miss Elizabeth Frey (see above); Miss Mary Lewis, 151 Storer Ave., Akron 2, Sec'y., Ohio S.M.T., or Miss Edna Luneke (see above)

OREGON: Miss Agnes Marie Lyman, St. Vincent's Hospital, Portland, Sec'y., Oregon S.M.T. or Miss Mary Wood (see above)

PENNSYLVANIA: Miss Licia G. Gambescia, 3101 School Lane, Drexel Hill, Sec'y., P.S.M.T. & L.T., or Miss Elizabeth Frey (see above)

SOUTH CAROLINA: Miss Ida Reilly (see above)

TENNESSEE: Miss June M. Brown, 3515 Granny White Road, Nashville, Sec'y., Tenn. S.M.T., or Miss Lucille Godelfer (see above)

UTAH: Miss Marguerite George, Holy Cross Hospital, Salt Lake City, Sec'y., Utah S.M.T., or Miss Mary Wood (see above)

VERMONT: Miss Elizabeth Frey (see above)

VIRGINIA: Miss Ida Reilly (see above)

WASHINGTON: Miss Mary Wood (see above)

WISCONSIN: Miss Margaret Foley, 2039 N. State St., Milwaukee, Sec'y., Wisc. Ass'n. of M.T.s or Miss Edna Luneke (see above)

TERRITORIES AND FOREIGN: Miss Jeanne Jorgenson, 900 Modoc St,. Berkeley 7, California

Advance Reservations for Entertainment for A.S.M.T. Convention are requested. Please check and mail to Miss Frieda Claussen, 469 Laurel Ave., St. Paul 2, Minn., before May 1, 1948.

A.S.M.T. ROSTER SUPPLEMENT

ALABAMA

Brown, Mrs. Chloette O.
8430 Fourth Ave. South
Birmingham

Callahan, Marion Lee
800 South 20th St.
Birmingham

Horn, Elizabeth
1117 Montauk Ave.
Mobile 20

James, Mary Frances
812 South 20th St.
Birmingham

Salter, Erma Louise
708 Tuscaloosa Ave.
Birmingham 7

ARKANSAS

Friend, Margherita
2120 State St.
Little Rock

Stern, Virginia M.
2000 N. Harrison
Little Rock

Thornhill, Jeannette Strickland
3421 High St.
Little Rock

CALIFORNIA

Bronsema, Carol R.
719 W. 47th St., Apt. 7
Los Angeles 37

Heinemann
1416 Flower
Bakersfield

Rooney, Joan
3616 Main St.
Riverside

Walsh, Ardis E.
2149 Lugo Ave.
San Bernadino

COLORADO

Foley, Peggy Cole
932-15th St.
Boulder

Letts, Mrs. Ada Beth
1535 Monaco
Denver

Porreca, Marie S.
945 E. Abriendo
Pueblo

Schuknecht, Dorothy Arlene
2839 Wyandot St.
Denver

Taylor, Mildred W.
645 Marion
Denver 3

CONNECTICUT

Jillison, Faith E.
Charlotte Hungerford Hospital
Torrington

Mickles, Shirley G.
New Britain Gen. Hospital
New Britain

FLORIDA

Britt, Mildred L.
Jackson Memorial Hospital
Miami 36

Gaines, Helen A.
1170 East Brainard St.
Pensacola

Garcia, Violetta
1008-13th Ave.
Tampa

Jones, Mary Louise
Lab. The Medical Center
24 West Chase St.
Pensacola

Keyser, Mrs. Iona Lee
Rt. 4, Box 729
Lakeland

Vogt, Agnes McGuire
P. O. Box 1028
Daytona Beach

GEORGIA

Jurney, Willard Evelyn
Grady Memorial Hospital,
Main Lab.
Atlanta

Kelly, Annette
224 Bartow St.
Thomasville

Zellner, Kathryn Lois
1212 Clifton Road, N.E.
Atlanta 6

ILLINOIS

Bowman, June Evelyn
8225 St. Lawrence
Chicago 19

Burwell, Laura Allison
3848 N. Central Park Ave.
Chicago 18

Geoppner, Mrs. Betty
2625 Main St.
Quincy

Hoffman, Mae E.
1014 W. Stephenson St.
Freeport

(Schuler), Sr. M. Petronilla
St. Elizabeth Hospital
Granite City

Scott, Lois Ann
1801 N. Dearborn St.
Chicago 10

INDIANA

Boyer, Carol Constance
606 E. Fifth St.
N. Manchester

Knox, Mary Alice
3010 Park Ave.
Indianapolis

Kottlowski, Helen H.
1230 Villa Ave.
Indianapolis 3

Olson, Marion Lorraine
640 Roosevelt St.
Gary

Schleuder, Carol Margot
725 N. Pennsylvania
Indianapolis

Spurlin, Ida M.
527 So. Chestnut St.
Seymour

KANSAS

Brand, Virginia
516 Sherman
Wichita

Carmichael, Virginia
215 N. Seneca
Wichita

(Debes), Sr. M. Emanuel
St. Rose Hospital
Great Bend

Eberhardt, Lucile A.
115 So. Erie
Wichita

Guest, Margaret Joanne
1047 Home St.
Topeka

Miller, Emma June
Rt. 4, Box 155
Winfield

Sauzek, Mary Jane
2034 N. Market
Wichita 4

Wilhoit, Sylvia Patricia
416 So. 7th St.
Salina

KENTUCKY

Crutchfield, Mrs. Floy L.
Medical Field Research Lab.
Ft. Knox

Halppen, Mildred Patricia
308 E. 18th St.
Hopkinsville

Karrer, Mary Margaret
968 Vine St.
Louisville 4

Wahl, Jeanette A.
1027 E. Kentucky St.
Louisville

LOUISIANA

Kent, Anetha
1516 Maple St.
Shreveport

MARYLAND

Behr, Mary Eleanor
128 N. Kenwood Ave.
Baltimore 24

MASSACHUSETTS

Fuller, Shirleyann
23 Lee St.
Salem

Oropeza, Aurora
86 Summer St.
Watertown 72

MICHIGAN

Meyers, Motzie Ann
755 Washington St.
Monroe

Mize, Mrs. Rose Mary
Blodgett Memorial Hospital
Grand Rapids

Walt, Ethel E.
2501 W. Grand Blvd.
Detroit

MINNESOTA

Anderson, Eleanore A.
259 Carroll Ave.
St. Paul 3

Arendt, Janelle S.
222 Clifton Ave.
Minneapolis

Cody, Marion
153 S. Lexington
St. Paul

Dimunation, Anne E.
314 Sixth Ave. N.E.
Minneapolis

Dodsworth, Dorothy
112 North Cedar Lake Road
Minneapolis

Dornbusch, Elizabeth A.
916 E. 15th St.
Minneapolis 4

Dudley, Mary
54 South Wheeler St.
St. Paul

Due, Marjorie
335 West Winona
St. Paul 7

Elmer, Lucille A.
St. Luke's Hospital
Duluth

Johnson, Evelyn M.
1029 East First St.
Duluth

(Knelleken), Sr. Borgia
St. Cloud Hospital
St. Cloud

Olsen, Constance
4130 Jefferson St., N.E.
Minneapolis

Paterson, Mrs. Virginia B.
420 University Ave., S.E.
Minneapolis 14

Maney, Patricia
2115-12 Avenue East
Mesaba Clinic
Hibbing

Moore, Violet Orrie
416-11th Avenue, S.E.
Minneapolis

Ogburn, Phyllis E.
405-8th Avenue East
Duluth

Omernik, Ellen
320 Walnut S.E.
Minneapolis 14

Rask, Virginia V.
143 East Arion St.
St. Paul

Roe, Ione L.
931 East 5th St.
Duluth

Sharp, Marjorie H.
1215 East First St.
Duluth

Thorne, Esther
389 Dayton Ave.
St. Paul 2

MISSISSIPPI

Moore, Nell Jacquelin
P. O. Drawer 231
Vicksburg

MISSOURI

Boehmer, Edith Annette
11323 Standard St.
Sugar Creek

Collins, Carolyn
3146 Main
Kansas City

Fesler, Elizabeth L.
4953 Parkview Place
St. Louis 10

Kunkel, Ann Elizabeth
4953 Parkview Place
St. Louis 10

MONTANA

Lapham, Agnes C.
1322-3rd Ave. North
Great Falls

NEW HAMPSHIRE

(Frost), Sr. Mary of Mercy J.
Sacred Heart Hospital
Manchester

NEW JERSEY

Criscitiollo, Antoinette Marie
79 Nelson Ave.
Jersey City

Duffy, Audrey Carol
20 Madison Ave.
New Providence

Flick, Helen E.
c/o Clinical Laboratory
Burlington Co. Hospital
Mount Holly

Harris, Jane Dagmar
334 Laurel Ave.
Pitman

Mansfield, Bette K.
6 Sylvan Road
Verona

Pallotta, Louise R.
21 Sixth St.
Harrison

NEW YORK

Chekansky, Helen
110 Crary Ave.
Binghamton

Joseph, Mrs. Rosemarie L.
4530 Broadway
New York 33

Phelps, Mary Alice
614 James St., Apt. 8
Syracuse

(Rees), Sr. M. Anthonise
689 Ft. Washington Ave.
New York 33

Thaw, Frances Sanel
56 West 65 St.
New York

NORTH CAROLINA

Boesser, Wilhelmina L.
Babies' Hospital, Rt. 3
Wilmington

Lyles, Doris Jean
2137 Westmoreland Ave.
Charlotte

(O'Brien), Sr. M. Juliana
St. Joseph's Hospital
Ashville

Schumacher, Lois V.
2033 Vail Ave.
Charlotte

Williams, Martha M.
236 Sulphur Springs Road
Ashville

OHIO

(Bartlett), Sr. M. Domitilla
116 Dayton St.
Hamilton

Clark, Carrie Pauline
935 North Limestone St.
Springfield

Moore, Virginia E.
265 Benita Ave.
Youngstown

Nidy, Mr. Robert D.
2533 Crown Place, N.W.
Canton 3

Schaeufele, Alfred
Cleveland State Hospital
Cleveland 5

Shaffer, Harold Roy
2123 Evansdale Ave.
Toledo 7

OKLAHOMA

Freeland, Glenna
824 D. Northwest
Ardmore

(Grace), Sr. M. Constance
Benedictine Heights Hospital
Guthrie

Thornton, Wanda F.
541 N.E. 12th
Oklahoma City

OREGON

Bleeg, Mary E.
3454 N.E. Couch St.
Portland 15

Bocek, Rose Mary
6006 N. Mississippi Ave.
Portland 11

Dollowitch, Helen Mary
Route 1, Box 214
Boring

Van den Biesen, Frances A.
3957 E. Burnside
Portland

Wentworth, Patricia Ann
3030 N.E. Thompson
Portland 12

PENNSYLVANIA

Brinker, Arthur T.
R.F.D. 1, Box 48 S
Latrobe

Casey, Jule Ann
21 Garfield Ave.
Carbondale

Fenstemaker, Mary D.
1013 North Front St.
Harrisburg

Ferenchak, Mary Josephine
Flint Hill
Swedeland

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Frackville

Hart, Eleanor D.
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Bryn Mawr

Hutton, Dorothy Ann
603 Bloom St.
Danville

McConville, Mary E.
1013 North Front St.
Harrisburg

Morris, Betty Jane
7048 Woodland Ave.
Philadelphia 42

Moses, Elizabeth Jean
Hanover General Hospital
Hanover

Nelson, Coralie Vivian
12 Sherman Place
Woburn

Pringle, Hannah M.
Box 102
Merrittstown

RHODE ISLAND

Forrest, Audrey
90 Knollwood Ave.
Cranston 10

SOUTH CAROLINA

Allen, Norene G.
746 Milton Ave.
Rock Hill

SOUTH DAKOTA

Jones, Stephen Smith, Jr.
1018 South First Ave.
Sioux Falls

TENNESSEE

Bridges, Trula Belle
2730 Central Pike
Knoxville

Mead, Audrey
1734 Central Ave.
Memphis

Rawls, Jane Ellen
3428 Highland Park Place
Memphis

TEXAS

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San Antonio

Barkard, Mrs. Charles
536 W. King's Highway
San Antonio

Behrns, Lilia
1546 Mistletoe Ave.
San Antonio

Blount, Elizabeth
741 Ruiz St.
San Antonio

Bond, Marianne M.
Brackenridge Hospital Lab.
Austin

Buck, Bonnie
115 W. 19th St.
Houston

Buhrer, Genevieve
4713 Junius St.
Dallas 1

Butterfield, Lanelle
V. A. Hospital
Temple

Cook, Mackie Bob
1420½ Cooper St.
Ft. Worth, 4

Ferguson, Martha Anne
200 South Main
Childress

Guinn, Elizabeth
Box "B"
Seagoville

Heiligman, Fred
505 West 23rd
Austin

Love, Mary Bess
Jones-Watkins Clinic
Wellington

MacNerney, Kathleen O.
2501 San Gabriel, Apt. 5
Austin

Martin, Maxine
Goodall-Witcher Clinic
Hospital
Clifton

Nebrig, Elizabeth Ann
1625 Lucile St.
Wichita Falls

(Oles), Sr. M. Ladislas
Refugio County Hospital
Refugio

(Remian), Sr. M. Ignatius
Loretto Hospital
1411 Denver
Dalhart

Tyler, Gloria Y.
1211 McKinley Ave.
San Antonio

Wallace, Mrs. Doris May
8208 Jennings
Houston 12

Wayne, Faith
3306 Carpenter
Dallas 10

White, Betty June
2501 Crawford
Houston 3

VIRGINIA

Albright, Patricia A.
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Alexandria

Austin, Joy
10 Oakhurst Circle
Charlottesville

Cowlter, Mary Harris
2922 Seminary Ave.
Richmond

Fort, Mrs. Doris L.
310 Park Place
Charlottesville

Gill, Mary J.
Route 4, Box 234
Richmond

Haley, Jene G.
321-56th St.
Newport News

Walker, Mrs. Margaret B.
Algonquin Park
Norfolk

West, Betty Bromley
2115 Crystal Spring Ave.
Roanoke

WASHINGTON

Schneider, Ethel
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Seattle 11

WEST VIRGINIA

Fryer, Miriam Ann
412 Main St.
Wheeling

WISCONSIN

Biel, Shirley Ann
1129 N. 21st St.
Milwaukee 3

Gerhardt, Mary Rose
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Milwaukee 5

Honey, Myrtle E.
7130 W. Wisconsin Ave.
Wauwatosa 13

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1625 North 51st St.
Milwaukee 3

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2952 North Frederick Ave.
Milwaukee 11

Koepke, Hedwig E.
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Milwaukee 6

Kovitz, Charlotte
2439 North Teutonia Ave.
Milwaukee

Kuligowski, Dolores T.
3126 South 42nd St.
Milwaukee

Leedle, Dorothy
Walworth

Lutsey, Winifred E.
3425 North 15th St.
Milwaukee

(Regal), Sr. Genevieve
St. Mary's Hospital
Watertown

Retelstorf, Caroline D.
2522 North Lake Drive
Milwaukee

Runquist, Ida May
Pippin Clinic
Richland Center

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Lake Geneva

Slomovitz, Shirley
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